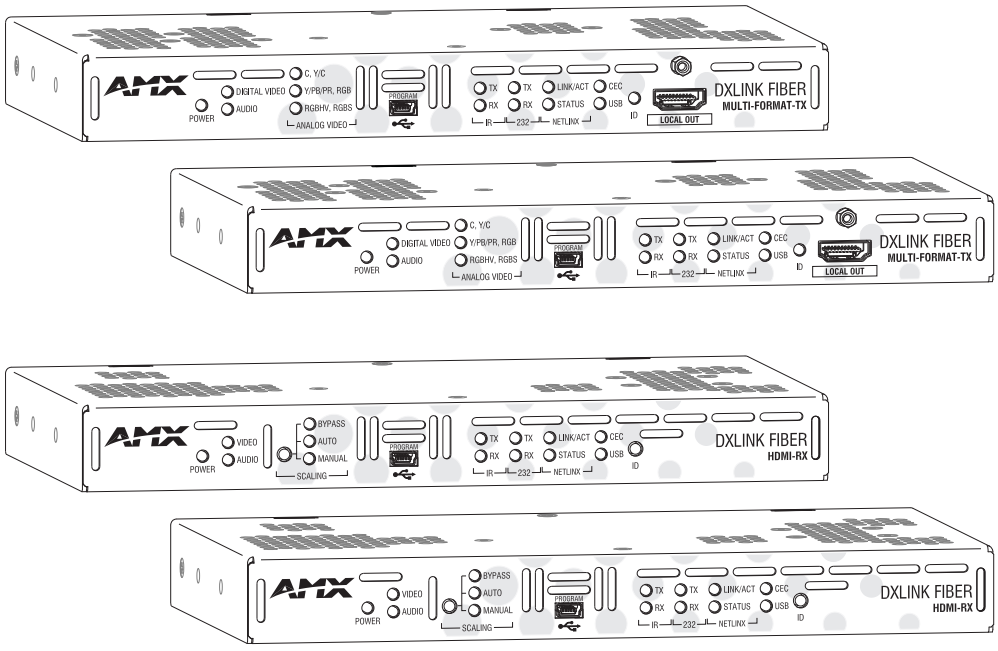
# Instruction Manual

## DXLink™ Fiber Transmitters and Receivers, Duplex

DXLink Multi-Format SMF-D Transmitter
DXLink Multi-Format MMF-D Transmitter
DXLink HDMI SMF-D Receiver
DXLink HDMI MMF-D Receiver



# AMX Domestic Channel Partner Limited Warranty, Disclaimer and License

(Excerpt from CHANNEL PARTNER TERMS AND CONDITIONS Versions 11.17.2011 with updates for previous version 8.25.2010 [sections 6.1 (a), (b) and (f)])

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Version Date: 11-17-11

**Note:** *The complete Warranty is at www.amx.com.*

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# ESD Warning

To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before touching any internal materials.

When working with any equipment manufactured with electronic devices, proper ESD grounding procedures must be followed to make sure people, products, and tools are as free of static charges as possible. Grounding straps, conductive smocks, and conductive work mats are specifically designed for this purpose.

Anyone performing field maintenance on AMX DXLink Fiber equipment should use an appropriate ESD field service kit complete with at least a dissipative work mat with a ground cord and a UL listed adjustable wrist strap with another ground cord. These items should not be manufactured locally, since they are generally composed of highly resistive conductive materials to safely drain static charges, without increasing an electrocution risk in the event of an accident. ESD protective equipment can be obtained from 3M™, Desco®, Richmond Technology®, Plastic Systems®, and other such vendors.

# Important Safety Information and Instructions

When using and installing your AMX product, adhere to the following basic safety precautions. For more information about operating, installing, or servicing your AMX product, see your product documentation.

- Read and understand all instructions before using and installing AMX products.
- Use the correct voltage range for your AMX product.
- There are no user serviceable parts inside an AMX product; service should only be done by qualified personnel.
- If you see smoke or smell a strange odor coming from your AMX product, turn it off immediately and call technical support.
- For products with multiple power supplies in each unit, make sure all power supplies are turned on simultaneously.
- Use surge protectors and/or AC line conditioners when powering AMX products.
- Only use a fuse(s) with the correct fuse rating in your enclosure.
- Make sure the power outlet is close to the product and easily accessible.
- Make sure the product is on or attached to a stable surface.
- Turn off equipment before linking pieces together, unless otherwise specified in that product's documentation.
- For safety and signal integrity, use a grounded external power source and a grounded power connector.
- To avoid shock or potential ESD (Electrostatic Discharge) damage to equipment, make sure you are properly grounded before touching components inside an AMX product.

# Information et directives de sécurité importantes

Veuillez vous conformer aux directives de sécurité ci-dessous lorsque vous installez et utilisez votre appareil AMX. Pour de plus amples renseignements au sujet de l'installation, du fonctionnement ou de la réparation de votre appareil AMX, veuillez consulter la documentation accompagnant l'appareil.

- Lisez attentivement toutes les directives avant d'installer et d'utiliser les appareils AMX.
- Le voltage doit être approprié à l'appareil AMX.
- Les appareils AMX ne contiennent aucune pièce réparable par l'usager; la réparation ne doit être effectuée que par du personnel qualifié.
- Si de la fumée ou une odeur étrange se dégagent d'un appareil AMX, fermez-le immédiatement et appelez le Service de soutien technique.
- Veillez à ce que tous les blocs d'alimentation des appareils dotés de blocs d'alimentation multiples dans chaque unité soient allumés simultanément.
- Servez-vous de protecteurs de surtension ou de conditionneurs de lignes à courant alternatif lorsque vous mettez les appareils AMX sous tension.
- Placez uniquement des fusibles de calibre exact dans les boîtiers.
- Veillez à ce que la prise de courant soit proche de l'appareil et facile d'accès.
- Veillez à ce que votre appareil AMX soit installé sur une surface stable ou qu'il y soit fermement maintenu.
- Fermez toutes les composantes de l'équipement avant de relier des pièces, à moins d'indication contraire fournie dans la documentation de l'appareil.
- Par mesure de sécurité et pour la qualité des signaux, servez-vous d'une source d'alimentation externe mise à la terre et d'un connect d'alimentation mis à la terre.
- Pour éviter les chocs ou les dommages éventuels causés à l'équipement par une décharge électrostatique, veillez à ce le dispositif oit bien relié à la terre avant de toucher les composantes se trouvant à l'intérieur d'un appareil AMX.

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## Warnings and Cautions

This manual uses the following conventions and icons to draw attention to actions or conditions that could potentially cause problems with equipment or lead to personal risk.

**ESD Warning:** *The icon to the left indicates text regarding potential danger associated with the discharge of static electricity from an outside source (such as human hands) into an integrated circuit, often resulting in damage to the circuit.*

**Warning:** *The icon to the left indicates text that warns readers against actions or conditions that could cause potential injury to themselves.*

**Caution:** *The icon to the left indicates text that cautions readers against actions that could cause potential injury to the product or the possibility of serious inconvenience.*

# Overview DXLink Fiber, Duplex

## Applicability Notice

The information in this manual applies to the AMX DXLink Fiber Transmitters and Receivers, Duplex listed in the table below. These units handle simultaneous, bidirectional data transfer. They are available in both multimode and single mode models (which differ only in respect to their transceivers which support different cable lengths).

Throughout this manual, the phrase "DXLink Fiber units" will be used when referring generically to all four of the DXLink Fiber, Duplex product models.

When referring to specific Duplex models, they will be described as follows:

- Multi-Format MMF-D TX*
- HDMI MMF-D RX*
- Multi-Format SMF-D TX**
- HDMI SMF-D RX**

* MMF-D = multimode fiber - duplex

** SMF-D = single mode fiber - duplex

### DXLink Fiber Transmitters and Receivers, Duplex

| Part # | Model Name | Model Number, Description |
|---|---|---|
| FG1010-362^ | DXLink Multi-Format Multimode Fiber Transmitter, Duplex | DXLF-MFTX-MM-D,<br>DXLINK MULTI-FORMAT MM FIBER TX, DUPLEX |
| FG1010-360^ | DXLink Multi-Format Single Mode Fiber Transmitter, Duplex | DXLF-MFTX-SM-D,<br>DXLINK MULTI-FORMAT SM FIBER TX, DUPLEX |
| FG1010-562^^ | DXLink HDMI Multimode Fiber Receiver, Duplex | DXLF-HDMIRX-MM-D<br>DXLINK HDMI MM FIBER RX, DUPLEX |
| FG1010-560^^ | DXLink HDMI Single Mode Fiber Receiver, Duplex | DXLF-HDMIRX-SM-D,<br>DXLINK HDMI SM FIBER RX, DUPLEX |

^ On the rear of both Transmitter units, the number will be FG1010-36X, indicating they share a common metal box design.
^^ On the rear of both Receiver units, the number will be FG1010-56X, indicating they share a common metal box design.

The multimode and single mode fiber optic transceivers allow for in-the-field replacement.

**Compatibility Note:** *In Enova DGX systems using DXLink Fiber technology – the DXLink Fiber Input Board and its DXLink Fiber TX, Duplex must have the same type of fiber optic transceivers: either multimode or single mode. The same holds true for DXLink Fiber Output Boards and the DXLink Fiber RX, Duplex units.*

**Important:** *Use of a DXLink Fiber Transmitter and Receiver as a standalone pair will be supported in a future firmware upgrade.*

# Product Notes

## Fiber Optic Transceivers

The DXLink Fiber units use SFP+ fiber optic transceivers.* Fiber optic transceivers are self-contained modules that send and receive optical signals over fiber cable. These fiber optic transceivers are either multimode or single mode and must be wired with the corresponding cable type.

* SFP+ = enhanced small form-factor pluggable fiber optic transceiver rated at 10 Gbps transmission data rate.

**Note:** *The types of fiber optic transceivers used in DXLink Fiber units are referred to as "multimode" and "single mode," which indicate the maximum length of the fiber optic cable that can be used. In addition, the Transmitters and Receivers support modes that can be determined during setup to handle the system architecture, accommodate networking needs, and process video signals (see page 26).*

### *Transceiver Types / Cable Types / Cable Runs*

The type of SFP+ fiber optic transceiver helps determine the maximum length of cable runs possible. Cable quality is also a determining factor.

**SFP+ Fiber Optic Transceivers**

| Transceiver Type | DXLink Fiber, Duplex Units | Required Cable Type | Maximum Distance |
|---|---|---|---|
| Multimode | • Multi-Format MMF-D TX<br>• HDMI MMF-D RX | OM3 50/125 µm multimode fiber optic | 984 ft. (300 m) |
| Single Mode | • Multi-Format SMF-D TX<br>• HDMI SMF-D RX | 9/125 µm single mode fiber optic | 6.21 miles (10 km) |

All DXLink Fiber units are designed for transmission of an HDMI signal over fiber optic cable.

Both multimode and single mode transceivers on DXLink Fiber units support bidirectional communication (Bidirectional Mode).

Bidirectional communication over DXLink Fiber includes transmission of the following:

- Digital video and audio
- Native NetLinx control
  - IR
  - RS-232
- USB keyboard and mouse
- Ethernet (100 Mbps)

**Warning:** *DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive below).*

### *OSHA Directive*

The *OSHA Technical Manual* (at https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_6.html) under "VI. Control Measures and Safety Programs" states: "Direct exposure on the eye by a beam of laser light should always be avoided with any laser, no matter how low the power."

### *Transceiver Disposal*

**Important:** *If disposal of transceivers is necessary, dispose of them as mandated by your area or country guidelines.*

### Multimode SFP+ Fiber Optic Transceiver

A multimode SFP+ fiber optic transceiver is used for the Multi-Format MMF-D TX and the HDMI MMF-D RX. Depending on the transceiver model, it will have a latch that is black or a black label on the latch top with white triangles showing data flow direction.

The multimode SFP+ fiber optic transceiver requires multimode fiber optic cable, which allows numerous optical waves to traverse the optic core. Multimode fiber optic cable has a significantly larger optical core (which results in a higher dispersion rate) and results in comparative shorter distance optical runs than the single mode cable.

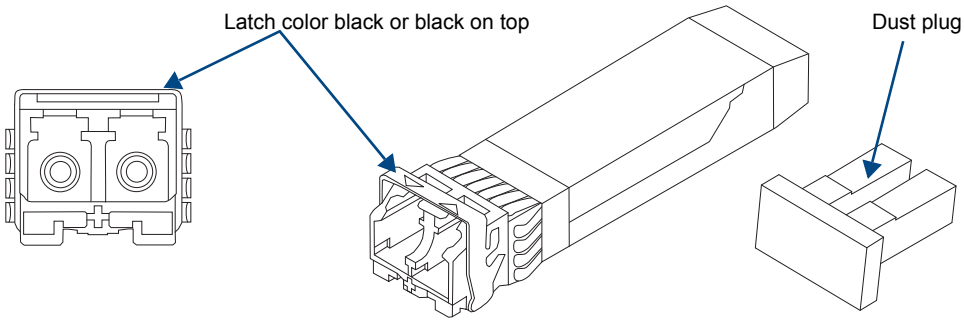



**FIG. 1** Multimode SFP+ fiber optic transceiver (model with black label on latch top shown)

### *Single Mode SFP+ Fiber Optic Transceiver*

A single mode SFP+ fiber optic transceiver is used for the Multi-Format SMF-D TX and the HDMI SMF-D RX. Depending on the transceiver model, it will have a bright blue latch or a blue label on the latch top with white triangles showing data flow direction.

The single mode SFP+ fiber optic transceiver requires single mode fiber optic cable, which allows a single optical wave to traverse through the optic core. Single mode fiber optic cable has a significantly smaller diameter optical core than multimode fiber optic cable and is generally associated with longer distance transport capabilities.

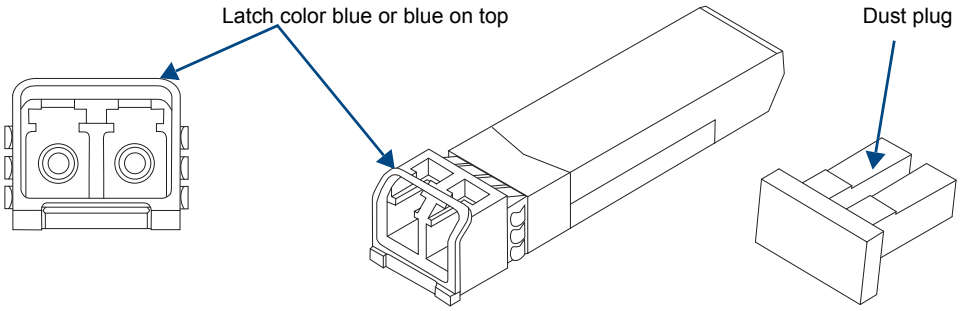



**FIG. 2** Single mode SFP+ fiber optic transceiver (model with blue latch shown)

### Multi-Format MMF-D TX and Multi-Format SMF-D TX

The DXLink Fiber Transmitters, Duplex receive an HDMI signal or analog video signal (composite, Y/C, Y/Pb/Pr, RGB, RGBS, or RGBHV) and an audio signal from a source device. The audio can be either digital audio embedded with the HDMI or analog stereo audio.

Either analog or digital video is transmitted out of the fiber optic transceiver. The active video selection is made using one of two methods:

- Automatic – selects digital video as the priority video input or analog video when digital video is not present. Can be set to treat either the digital or analog video as the priority, which then defaults to the opposite if the primary is not present.
- Active SEND_COMMAND video input selection from a bound NetLinx Central Controller (usually the integrated Central Controller on the Enova DGX).

Both the video and audio are transported over fiber optic cable to an Enova DGX Digital Media Switcher. The unit also has a local HDMI output connector on the front for sending the video signal from the source directly to a local destination device. This local HDMI output connection supports the same input resolutions contained in the first table in "Appendix E - Supported Input Resolutions" (see page 119).

The 232 port (RS-232) on the Transmitters supports bidirectional serial data via the fiber optic cable to/from the 232 port. In addition, the Transmitters have IR ports, which also send data via the fiber optic cable.

### HDMI MMF-D RX and HDMI SMF-D RX

The DXLink Fiber Receivers, Duplex feature SmartScale® Technology (integrated EDID output scaling) to ensure an appropriate output resolution, plus they support a Manual (override) option for setting up custom resolutions and a Bypass option (see page 50).

The DXLink Fiber Receivers receive an HDMI signal and an audio signal over fiber optic cable from a DXLink Fiber, Duplex Output Board on an Enova DGX Switcher. They then send the signal on to the destination. The audio output can be either digital audio embedded with the HDMI signal or analog stereo audio (if the signal originated as a 2 channel audio format).

The 232 ports (RS-232) support bidirectional serial data via the fiber optic cable, which connects the DXLink Fiber TX/RX units and the Enova DGX Switcher.

**Note:** *If a DVI-D signal is used (via a DVI-to-HDMI cable), the advanced audio support from HDMI will not be available out the Receiver.*

**Note:** *DXLink Fiber units support several different modes which are available for system setup and use. Brief explanations of the modes are provided in the section "Quick Reference Tables for Modes" on page 26 along with page references to detailed information.*

## Product Compatibility

DXLink Fiber Transmitters and Receivers, Duplex work in conjunction with Enova DGX DXLink Fiber Duplex Boards as specified in the following table.

| DXLink Fiber TX/RX, Duplex and Enova DGX DXLink Fiber, Duplex Board Compatibility | |
|---|---|
| **DXLink Fiber, Duplex Unit** | **Enova DGX DXLink Fiber, Duplex Board** |
| Multi-Format MMF-D Transmitter (FG1010-362) | MMF-D Input Board (FG1058-622) |
| HDMI MMF-D Receiver (FG1010-562) | MMF-D Output Board (FG1058-632) |
| Multi-Format SMF-D Transmitter (FG1010-360) | SMF-D Input Board (FG1058-620) |
| HDMI SMF-D Receiver (FG1010-560) | SMF-D Output Board (FG1058-630) |

## Features – DXLink Fiber Transmitters and Receivers, Duplex

- Optical transport rate of 10 Gbps.
- Incorporates HDMI® technology.
- HDCP 1.3 compatible.
- Supports computer video up to 1920x1200, HDTV up to 1080p, as well as 3D support (3D and Deep Color).
- Supports HDMI pass through with embedded digital audio and single link DVI (via DVI-to-HDMI cable).
- A local HDMI output connector on the front of the Transmitters for sending the video signal from the source directly to a local destination device.
- DXLink Fiber TX, Duplex units support analog video: composite, Y/C, Y/Pb/Pr, RGB, RGBS, or RGBHV.
- DXLink MMF-D units transport video signals over distances up to 984 feet (300 m).
- DXLink SMF-D units transport video signals over distances up to 6.21 miles (10 km).
- Interruption free content when used in conjunction with a switcher; AMX's exclusive InstaGate Pro® Technology allows audio and video to be switched quickly and easily to every connected display without the difficulties typically associated with HDCP.
- AutoDetect on the Transmitters and SmartScale® on the Receivers work to automatically recognize any device's supported resolutions and signal type parameters, allowing switching out source and destination devices without manual setup. Also included is the ability to control detailed timing parameters for customized video output formats. (SmartScale is the ability to configure the scaling output by automatically selecting destination defined resolutions.)
- Supports HDMI embedded digital audio and analog stereo audio.
- Fiber optic cable (for fiber cable specifications, see page 28).
- Field serviceable SFP+ fiber optic transceivers, easier to remove and replace an individual transceiver rather than a TX or RX unit or an Enova DGX DXLink Fiber Board.
- The USB port on the Receivers passes keyboard and mouse USB signals to control a remote computer. The Transmitter's USB port connects to a Host PC and will forward HID keyboard and mouse data received from a Receiver's USB port (for USB information, see page 23).
- The 232 port (RS-232 serial) supports bidirectional transfer of serial data between TX/Master/RX (Endpoint Mode).
- The IR port supports bidirectional transfer of IR data between TX/Master/RX (Endpoint Mode).
- A desktop power supply (ENERGY STAR® qualified) is provided per DXLink Fiber unit.
- The Transmitters and Receivers are compatible with all V Style, versatile mounting options including rack, surface, and pole.
- Backed by AMX's 3 year warranty (see www.amx.com).
- 24-hour technical support.

**Note:** *Features and specifications described in this document are subject to change without notice.*

## Common Applications

DXLink Fiber Transmitters and Receivers, Duplex are ideal for any sources and destinations designed into Enova DGX integrated systems that require the distance capabilities and/or inherent security of fiber with bidirectional data transfer. These transmitters and receivers easily handle campus-wide distribution of sources that are shared between classrooms, in secure military applications, medical facilities, casinos, arenas, museums, and large corporate installations. Connect HDMI or video sources (such as PCs) directly using the HDMI or HD-15 multi-format input connection and easily include audio on the same fiber optic cable by using the stereo or digital audio connection.

## DXLink Fiber Transmitters, Duplex

The MMF-D TX and SMF-D TX are identical except for the type of fiber optic transceiver. The MMF-D TX has a multimode transceiver (the latch is black or has a black label), and the SMF-D TX has a single mode fiber optic transceiver (the latch is blue or has a blue label).

**Note:** *A DVI-D signal can be used (via a DVI-to-HDMI cable) into the Transmitter.*

### DXLink Fiber Transmitters, Duplex – Front View (TX-MULTI-DXLINK-MMF-D and TX-MULTI-DXLINK-SMF-D)

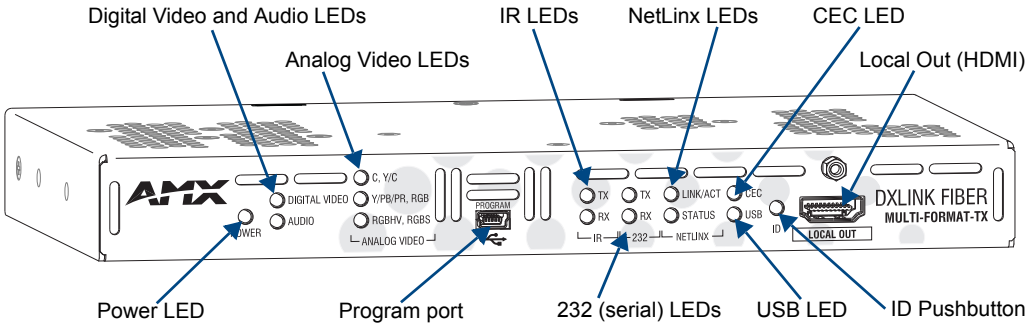



**FIG. 3** DXLink Fiber Transmitter, Duplex - front view

#### *Components located on the front of the DXLink Fiber Transmitters, Duplex (left to right):*

- Power LED ─ Indicates when the unit is powered on.
- Digital Video and Audio LEDs ─ Indicate the presence of digital video and digital audio signals, including an embedded audio signal on the HDMI path.
- Analog Video LEDs ─ Indicate the type of analog video present through the unit: composite or Y/C; Y/Pb/Pr or RGB; RGBHV or RGBS.
- Program port ─ This port (USB mini-B connector) supports DGX Configuration Software for programming a custom VGA or HDMI EDID.
- IR LEDs – TX and RX LEDs indicate active IR communication.
- 232 LEDs (RS-232 serial) – TX and RX LEDs indicate active serial communication (for details, see page 47).
- NetLinx LEDs – Link/Act LED indicates network communication activity. The Status LED indicates that the LAN connection is active.
- CEC LED – CEC is not currently supported.
- USB LED – When illuminated, the LED indicates that the USB port is connected and enabled (for details, see page 23).
- ID Pushbutton – Places the unit in ID Mode for setting the NetLinx ID (device only) and provides additional functionality, such as placing the unit in Static IP Mode or DHCP Mode (for details, see page 57).
- Local Out (video) ─ This HDMI connector can be used to send the source signal to a local monitor.

## LEDs – DXLink Fiber Transmitters, Duplex

| DXLink Fiber Transmitters, Duplex – Indicator LEDs on the Front | | |
|---|---|---|
| **LED** | **Normal Display** | **Indicates** |
| Power | Green | Power is applied to the unit |
| Digital Video | Green | A digital video signal is present through the unit |
| Audio (Digital) | Green | Embedded audio signal is present through the unit |
| Analog Video | One of the 3 LEDs will be Green | The type of analog video present through the unit:<br>• C (composite) or Y/C (two component)<br>• Y/PB/PR or RGB (three component)<br>• RGBHV (five component) or RGBS (four component) |
| IR TX | Red | IR TX active communication |
| IR RX | Yellow | IR RX active communication |
| 232 (Serial) TX | Red | Serial TX active communication |
| 232 (Serial) RX | Yellow | Serial RX active communication |
| NetLinx Link/Act | Green | Active LAN connection to an AMX Network (blinking = #3 Toggle OFF) |
| NetLinx Status | Green | LAN connection is active |
| CEC | OFF | CEC is not currently supported |
| USB | Yellow | USB is connected and enabled (for details, see page 23) |

**Note:** *For detailed behavior of the NetLinx Link/Act and Status LEDs on the unit's front, see page 52.*
*For detailed behavior of the ICS LAN 10/100 (RJ-45) connector LEDs on the unit's rear, see page 42.*

**Note:** *When an analog video source cable is plugged into the TX, one of the Analog Video LEDs on the front of the TX and the Video LED on the RX (connected via the switcher) turn green to show the type of video that is present through the system.*

## DXLink Fiber Transmitters, Duplex – Rear View

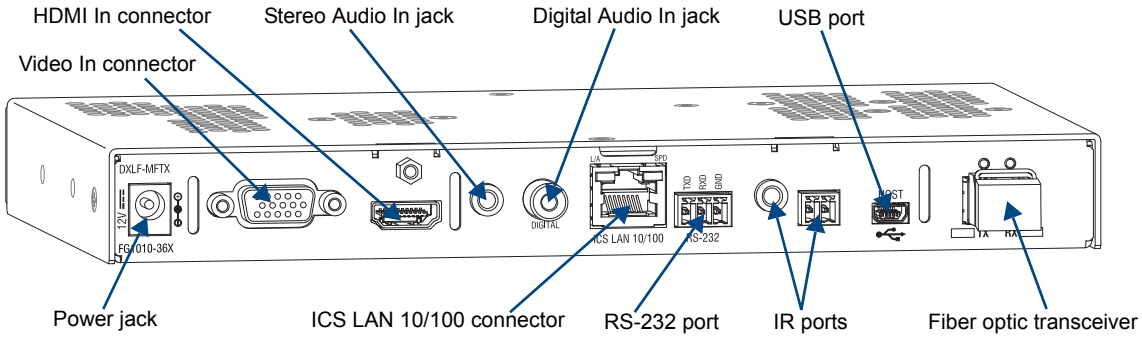



**FIG. 4** DXLink Fiber Transmitter, Duplex - rear view

### *Components located on the rear of the DXLink Fiber Transmitters, Duplex (from left to right):*

#### *Power Jack*

**Caution:** *The provided desktop power supply must be used to power the Transmitter, and it must not be altered in any way.*

The power receptacle is a 2.1 mm DC jack for connecting power. Power comes from the locally connected DC supply of 12 V. The automatically adjusting universal 110/220 IEC power supply is provided. The power supply is ENERGY STAR® qualified to ensure maximum efficiency and savings.

#### *Video In Connector*

The Video In connector on the TX is an HD-15 connector for analog video (composite, Y/C, Y/Pb/Pr, RGB, RGBHV, or RGBS). Pinouts for analog video are on page 117.

**Note:** *When an analog video source cable is plugged into the TX, one of the Analog Video LEDs on the front of the TX and the Video LED on the RX (connected via the switcher) turn green to show the type of video that is present through the system.*

### HDMI In Connector

The HDMI In connector is for digital video and embedded digital audio. When more than one audio signal is present and the default "auto" mode is enabled, HDMI embedded audio takes precedence over S/PDIF and analog audio.

When a NetLinx Central Controller is connected, an audio format SEND_COMMAND is available (the TX must be set for network connectivity via the #3 Toggle) to select the desired audio source (see page 75).

The HDMI connector has a center screw for locking capability. The HDMI connector also supports a DVI-D signal with the use of a DVI-to-HDMI cable.

**Note:** *When a digital video source cable is plugged into the HDMI connector, the Digital Video LED on the front of the TX and the Video LED on the Receiver (connected via the switcher) turn green to show that video is present through the system.*

### Stereo Audio In Jack

The Stereo Audio In jack is a 3.5 mm stereo jack. By default, the stereo audio jack will be third in priority behind the embedded audio on the HDMI input and digital audio on the RCA connector.

When a NetLinx Central Controller is connected, an audio format SEND_COMMAND is available (the TX must be set for network connectivity via the #3 Toggle) to select the desired audio source (see page 75).

### Digital Audio In Jack

The Digital Audio In jack is an RCA jack for an S/PDIF audio signal. When more than one audio signal is present and the default "auto" mode is enabled, HDMI embedded audio takes precedence over S/PDIF, which takes precedence over analog audio.

When a NetLinx Central Controller is connected, an audio format SEND_COMMAND is available (the TX must be set for network connectivity via the #3 Toggle) to select the desired audio source (see page 75).

### ICS LAN10/100 Connector

The ICS LAN 10/100 (RJ-45) connector provides for Ethernet 10/100 connectivity (e.g., receiving SEND_COMMANDs and downloading firmware update files). For pinout and LED information, see page 42.

**Note:** *The #1 Toggle on the DIP switch must be set to ON to enable activity over this port.*

### RS-232 (Serial) Port

The RS-232 serial data interface port is a 3-position screw terminal block which accepts data from the source device and transfers it via the fiber optic cable to the RX, which in turn transfers the data to the destination device. The transfer of data can also be made from the destination to the source. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

### IR RX Port

The IR RX port is used for IR control (see page 25). This port is a 3.5 mm stereo jack. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

### IR TX Port

The IR TX port is used for IR control (see page 25). This port is a 2-way mini-Phoenix connector. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

### USB Port

The USB-mini A/B "Host" port on the rear of the TX connects to a PC. The Host port forwards HID keyboard and mouse data received from a directed DXLink Receiver's USB port (the Receiver can be either Fiber or Twisted Pair). For USB port information, see page 23.

### *Fiber Optic Transceiver*

The fiber optic transceiver transports digital video, embedded audio, Ethernet, and bidirectional control over fiber optic cable to a DXLink Fiber Input Board, including digitally transcoded analog video signals. The DXLink Fiber path supports HDCP. If the latch is black or has a black label, the SFP+ fiber optic transceiver accepts multimode cable; if the latch is blue or has a blue label, the SFP+ fiber optic transceiver accepts single mode cable.

**Warning:** *DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 13).*

## DXLink Fiber Receivers, Duplex

The MMF-D RX and SMF-D RX are identical except for the type of fiber optic transceiver. The MMF-D RX has a multimode transceiver (the latch is black or has a black label), and the SMF-D RX has a single mode transceiver (the latch is blue or has a blue label).

**Note:** *If a DVI-D signal is used (via a DVI-to-HDMI cable), the advanced audio support from HDMI will not be available out the Receiver.*

### DXLink Fiber Receivers, Duplex – Front View (RX-DXLINK-HDMI-MMF-D and RX-DXLINK-HDMI-SMF-D)

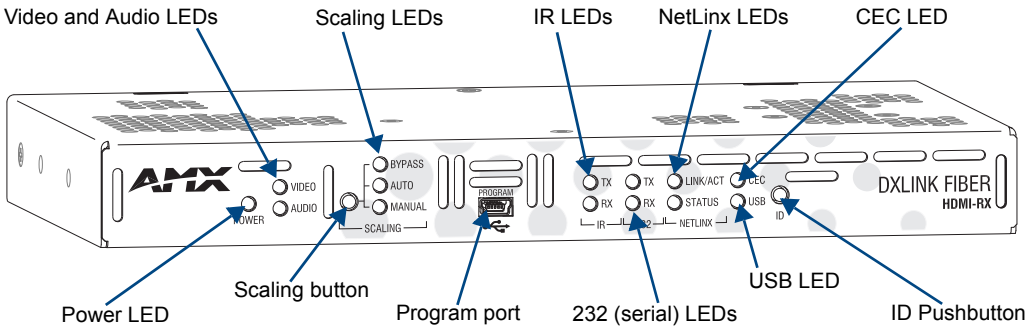



**FIG. 5** DXLink Fiber Receiver, Duplex - front view

### *Components located on the front of the DXLink Fiber Receivers, Duplex (left to right):*

- Power LED ─ Indicates when the unit is powered on.
- Video and Audio LEDs ─ Indicate the presence of video and embedded audio signals through the unit.
- Scaling button and LEDs ─ Use the Scaling button to select one of the 3 scaling options: Bypass, Auto (default), or Manual. For information on using the Scaling button and options for persisting the Scaling Mode, see page 50.
- Program port ─ This port will be supported in a future firmware upgrade.
- IR LEDs – TX and RX LEDs indicate active IR communication.
- 232 (RS-232) LEDs – TX and RX LEDs indicate active serial communication (for details, see page 47).
- NetLinx LEDs – Link/Act LED indicates network communication activity. The Status LED indicates that the LAN connection is active.
- CEC LED – CEC is not currently supported.
- USB LED – When illuminated, the LED indicates that the USB port connection has been established (for details, see page 23).
- ID Pushbutton – Places the unit in ID Mode for setting the NetLinx ID (device only) and provides additional functionality, such as placing the unit in Static IP Mode or DHCP Mode (for details see page 57).

## DXLink Fiber Receivers, Duplex – LEDs

| DXLink Fiber Receivers, Duplex – Indicator LEDs | | |
|---|---|---|
| **LED** | **Normal Display** | **Indicates** |
| Power | Green | Power is applied to the Receiver |
| Video | Green | A video signal is present through the Receiver |
| Audio | Green | An embedded audio signal is present through the Receiver |
| Scaling:<br>– Bypass<br>– Auto<br>– Manual | One LED is green; the other two are off | The Receiver is in one of the three modes for scaling<br>• At power up, the Receiver defaults to the Auto scaling option, unless a different scaling option has been persisted*<br>• Pressing the Scaling button cycles the unit through the options: Bypass, Auto, and Manual |
| IR TX | Red | IR TX active communication |
| IR RX | Yellow | IR RX active communication |
| Serial TX | Red | Serial TX active communication |
| Serial RX | Yellow | Serial RX active communication |
| NetLinx Link/Act | Green | Active LAN connection to an AMX Network |
| NetLinx Status | Green | LAN connection is active |
| CEC | OFF | CEC is not currently supported |
| USB | Yellow | USB is connected and enabled (for details, see page 23) |

* When the output cable is disconnected from the DXLink Fiber RX or if no EDID can be found on the destination device, the last used Scaling Mode LED will be ON. In either case, the DXLink Fiber RX will continue to hold its output resolution to the last known resolution until a sink with a valid EDID is connected. On power up without a valid EDID, the default output resolution presented will be 1280x1024 @ 60 Hz until a different EDID is detected.

**Note:** *For detailed behavior of the NetLinx Link/Act and Status LEDs on the unit's front, see page 52.*
*For detailed behavior of the ICS LAN 10/100 (RJ-45) connector's LEDs on the unit's rear, see page 42.*

## DXLink Fiber Receivers, Duplex – Rear View

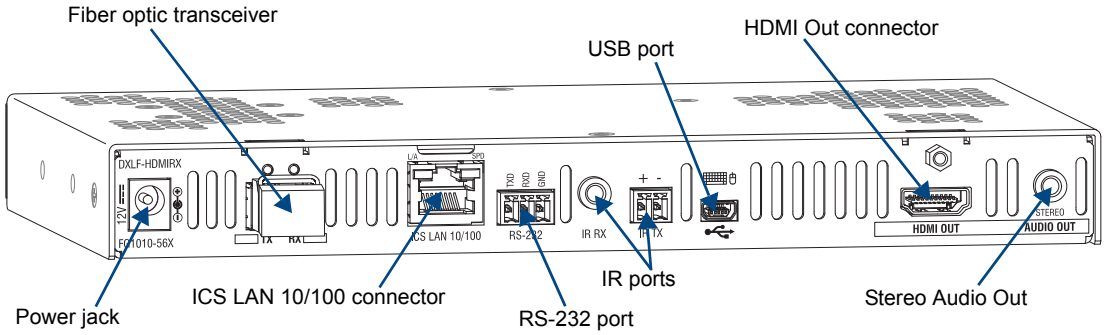



**FIG. 6** DXLink Fiber Receiver, Duplex - rear view

### *Components located on the rear of the DXLink Fiber Receivers, Duplex (left to right):*

#### *Power Jack*

**Caution:** *The provided desktop power supply must be used to power the DXLink Fiber RX, and it must not be altered in any way.*

The power receptacle is a 2.1 mm DC jack for connecting power. Power comes from the locally connected DC supply of 12 V. An automatically adjusting universal 110/220 IEC power supply is provided. The power supply is ENERGY STAR® qualified to ensure maximum efficiency and savings.

### Fiber Optic Transceiver

The fiber optic transceiver receives digital video, embedded audio, Ethernet, and bidirectional control over fiber optic cable from a DXLink Fiber Output Board, including digitally transcoded analog video signals. The DXLink Fiber path supports HDCP. If the latch is black or has a black label, the SFP+ fiber optic transceiver is multimode; if the latch is blue or has a blue label, the SFP+ fiber optic transceiver is single mode.

**Warning:** *DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 13).*

### ICS LAN 10/100 Connector

The ICS LAN 10/100 (RJ-45) connector is for Ethernet 10/100 connectivity (e.g., receiving SEND_COMMAND commands and downloading firmware update files). For pinout and LED information, see page 42.

**Note:** *The #1 Toggle on the DIP switch must be set to ON to enable activity over this port.*

### RS-232 Port

The RS-232 (serial data interface) port is a 3-position screw terminal block on the Receiver which accepts data (originally from a source device) via the Transmitter over DXLink Fiber and in turn transfers the data to the destination device. The transfer of data can also be made from the destination to the source. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

### IR RX Port

The IR RX port is used for IR control (see page 25). This port is a 3.5 mm stereo jack. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

### IR TX Port

The IR TX port is used for IR control (see page 25). This port is a 2-way mini-Phoenix connector. In addition to being directly connected to a device, this port can be connected as an independent native NetLinx control port from a networked NetLinx Central Controller.

### USB Port

The USB-mini A/B port on the rear of the Receiver supports keyboard/mouse commands. The HID keyboard and mouse data is sent via the Transmitter (which supports the USB connection) to the PC (the Transmitter can be either Fiber or Twisted Pair). For USB port information, see page 23.

### HDMI Out Connector

The HDMI Out connector is for digital video and embedded audio. The HDMI connector has a center screw for locking capability. The HDMI connector also supports a DVI-D signal (via a DVI-to-HDMI cable).

**Note:** *If a DVI-D signal is used (via a DVI-to-HDMI cable), the advanced audio support from HDMI will not be available out the Receiver.*

### Stereo Audio Out Connector

The Stereo Audio Out connector is a 3.5 mm stereo jack. This connector has an analog audio signal available for output whether the embedded audio over the fiber optic cable originated as 2 channel digital or analog stereo. If encoded digital audio or multi-channel audio paths are embedded on the HDMI path, then the local analog out will not be available.

# Common Features/Functionality

This section covers HDCP compliance, the DIP switches, the USB port, and IR functionality.

## HDCP Compliance

If the connected downstream sink is not HDCP compliant, then the HDMI output on the Receiver will not send the signal. This does not affect additional displays the source may be routed to, i.e., HDCP compliant displays will still show content from the source device even when the source device is also routed to non-compliant displays. Non-compliant devices can be easily identified because they display an orange or dark red image to indicate the authentication process failed.

## DIP Switches

**Tip:** *For easiest access to the DIP switch toggles, we recommend setting them before installation.*

**Important:** *When setting the DIP switch toggles, make sure any toggles that need to be ON are flipped toward the AMX sticker.*

A four-toggle DIP switch is on the bottom of the DXLink Fiber Transmitters and Receivers.

- **#1 Toggle** is used for enabling/disabling the physical ICS LAN 10/100 port (page 39).
- **#2 Toggle** is reserved for future functionality. Be sure that it is set to OFF.
- **#3 Toggle** is used for enabling/disabling network connectivity of the DXLink Fiber unit to a connected NetLinx Central Controller (used for IR ports, serial ports, and commands to the DXLink unit); page 39.
- **#4 Toggle** is reserved for future functionality. Be sure that it is set to OFF.

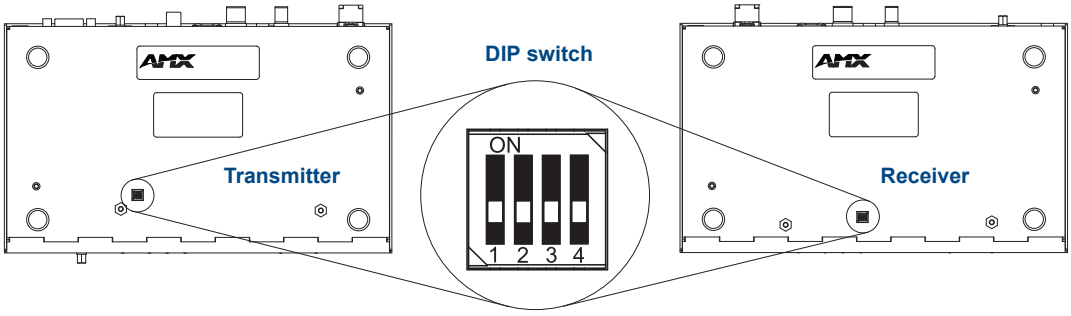



**FIG. 7** DIP switch location on DXLink Fiber, Duplex units

For complete information on setting DIP switches (including settings for common scenarios), see the section starting on page 38.

## USB Port (Rear)

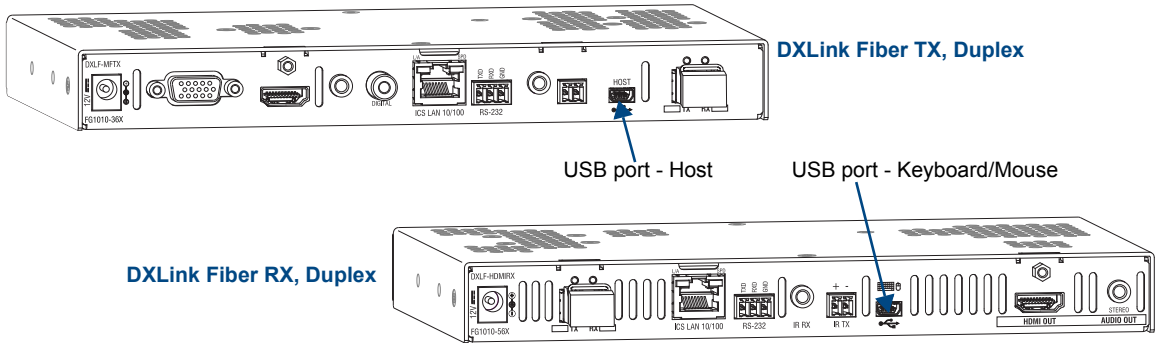



**FIG. 8** TX USB port – Host (top); RX USB port – Keyboard/Mouse (bottom)

### *DXLink Fiber Transmitters, Duplex*

The USB-mini A/B port labeled “Host” on the rear of the TX connects to a PC (which is the Host). The TX Host port forwards HID (Human Interface Device) keyboard and mouse data received via the switcher from a directed DXLink Receiver’s USB port (the Receiver can be either Fiber or Twisted Pair).

### *DXLink Fiber Receiver, Duplex*

The USB-mini A/B port on the rear of the Receiver supports keyboard/mouse commands. The HID keyboard and mouse data is sent via the switcher to the Transmitter (which supports the USB connection) and on to the PC. (The TX can be either Fiber or Twisted Pair.)

This port can be connected using one of the following methods:

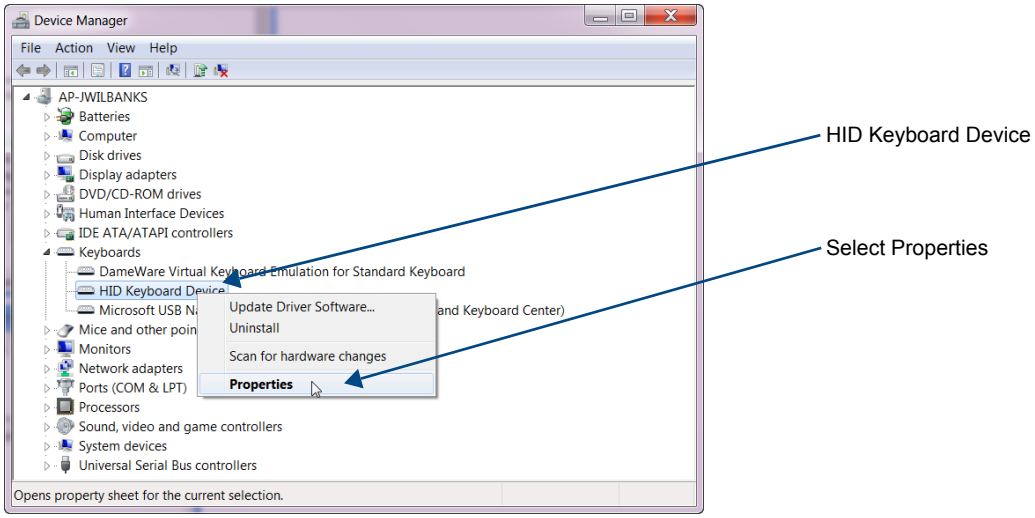
- By using a cable with a USB mini-A plug to connect a USB hub (to which a keyboard and mouse can be attached).
- By connecting directly to a keyboard or mouse using the appropriate mini-A plug adapter cable.

### *HID Devices and Windows 8*

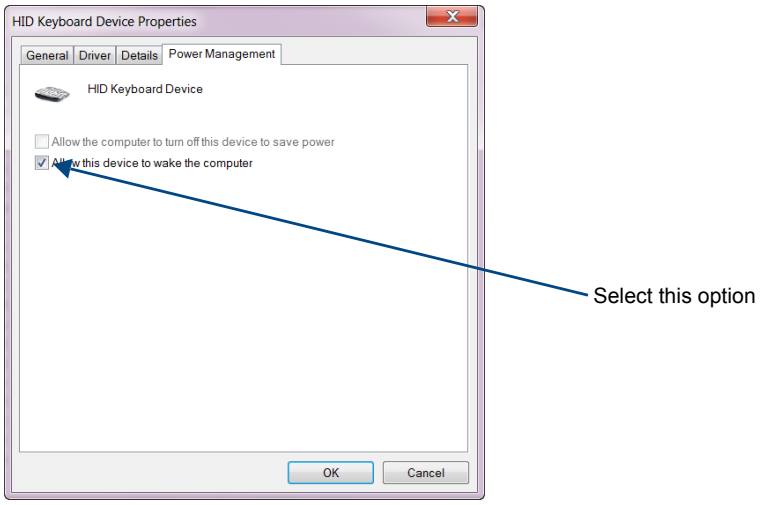
Windows 8 will not wake up from a DXLink connected keyboard or mouse unless the properties for the HID device are set to allow the device to wake the computer. (Note that even a hot plug of the USB cable will not restore connectivity.)

#### To set Windows 8 to work with DXLink Fiber units and HID devices:

1. On the PC, go to Start > Control Panel > Device Manager and expand “Keyboards.”
2. Right-click the HID Keyboard Device and select Properties.
   The HID Keyboard Device Properties dialog box opens.



3. Select the Power Management tab and click "Allow this device to wake the computer."




4. Click OK.
5. Repeat steps for HID mouse (in the Device Manager dialog box, expand "Mice").

### *HID Devices*

A list is available of HID devices which have been tested and found to be working well with the latest firmware (see "DXLink - HID Supported Devices" on the DXLink Fiber Receiver's product page at www.amx.com).

### *USB LED*

The USB LED on the front of a Transmitter or Receiver monitors the USB port on the rear of the unit. The USB LED illuminates (yellow) when a USB device is detected (the port default is "Enable").

To disable the port on the Transmitter, either disconnect the cable or send the following SEND_COMMAND: `USB_HID_SERVICE-DISABLE`. The Enable/Disable command persists through power cycling. To enable the port, send: `USB_HID_SERVICE-ENABLE`.

The USB ports support a limited number of SEND_COMMANDs; see page 82.

## IR Control on DXLink Fiber Transmitters and Receivers, Duplex (Optional)

The following two items are required for IR control. In addition, a compatible remote control unit can be used with the system. (The two items listed are not included with the units.)

- **IR03** – External IR Receiver Module (FG-IR03). The IR03 can be connected to the IR RX port on the Transmitter or to the IR RX port on the Receiver, allowing IR signals to be received from a compatible IR remote control. The IR03 allows the Transmitter to be placed behind the display device if desired.
- **CC-NIRC** – NetLinx IR Emitter Cable (FG10-000-11). The CC-NIRC can be connected to the IR TX port on the Transmitter or to the IR TX port on the Receiver. This allows IR signals to be sent to the source device from the Transmitter or to the display device from the Receiver.

## Quick Reference Tables for Modes

The DXLink Fiber Transmitters and Receivers, Duplex ship with either a single mode or multimode fiber optic transceiver, which determines the maximum length of the fiber optic cable that can be used (see "Product Notes" on page 13).

The Transmitters and Receivers also have modes that can be determined during setup to: (1) handle the system architecture, (2) accommodate networking needs, and (3) process video signals. The modes are listed in the following three tables and are supported by all of the DXLink Fiber Transmitters and Receivers, Duplex. The Quick Reference Tables are intended to provide users an overview of the many modes available for system setup and use. For complete information on any of the modes listed, see the relevant chapter or chapter section referenced at the end of the specific Description.

**Quick Reference Table 1 – Modes for Handling System Architecture**

| Mode | Description |
|---|---|
| **DXLink Fiber Mode (Endpoint Mode)** | The DXLink Fiber Mode refers to the type of physical components and how they are connected to make up the system. When DXLink Fiber Transmitters and Receivers are cabled into a system and powered on, they automatically detect the DXLink Fiber Endpoint Mode.<br>**Endpoint Mode:**<br>When the system is setup to use Transmitters and/or Receivers with an Enova DGX Digital Media Switcher enclosure, the system is in Endpoint Mode (see example on page 35). |
| **Directional Mode (Bidirectional Mode)** | Directional Mode refers to the flow of data within the system.<br>**Bidirectional Mode:**<br>When data flows in two directions, the flow is bidirectional. For example, a signal travels from the TX to the RX in Endpoint Mode (through the switcher) and a signal from an HID connected to the RX via the USB port travels back to the TX – see page 47. |

**Quick Reference Table 2 – Modes for Handling Addressing/Networking**

| Mode | Description |
|---|---|
| **IP Addressing Mode** | IP Addressing Mode refer to network connection settings. By default, all network connection settings are turned OFF.<br>**Static IP Mode:**<br>• This mode configures the network connection to one stable IP address the unit will use continuously.<br>**DHCP Mode**:<br>• This mode configures the network connection to choose a new IP address for each network session.<br>To enable network capability, see "Network Configuration" on page 54. |
| **ID Mode** | ID (Identify) Mode refers to the protocol for enabling a user to establish device addresses. This Mode, accessible through NetLinx Studio, places the entire system on hold while it waits for an event from a NetLinx device in the named system (e.g., pressing the ID Pushbutton on the TX or RX). For further information, see "Assign a Device Address (ID Mode)" on page 58. |
| **Ethernet Mode** | Ethernet Mode refers to the LAN configuration settings.<br>**Auto Mode:**<br>• This mode configures the LAN driver to discover its own settings based on the network it is connected to.<br>**Speed/Duplex Mode:**<br>• This mode configures the LAN driver to calculate its speed as either 10 or 100 and to communicate in either half- or full-duplex.<br>Ethernet Mode discovery and configuration information is available through Telnet commands. For further information, see "Establishing a Terminal Connection Via Telnet" on page 93. |

| Quick Reference Table 2 – Modes for Handling Addressing/Networking (continued) | |
|---|---|
| **Master Connection Mode** | Master Connection Mode refers to the modes of communication used for connection to the Master as specified via the SET CONNECTION Telnet command.<br>**Auto Mode:**<br>• This mode utilizes TCP communication. It looks for a matching System Number and attempts to come on line with the first Master it sees with that System Number.<br>**TCP URL Mode:**<br>• TCP; the Master is specified via URL.<br>**UDP URL Mode:**<br>• UDP; the Master is specified via URL.<br>**NDP Mode (Default):**<br>• UDP; utilizes the NDP binding process to assign the DXLink Fiber unit (the physical device) to a Master (or Virtual Master) via NetLinx Studio. Once bound, communications are conducted via UDP.<br>For further information, see “Master Connection Modes” on page 108. |
| **IR SEND_COMMAND Mode** | IR SEND_COMMAND Mode refers to displaying and setting the IR port active system settings as IR, Serial, or Data modes.<br>**GET MODE SEND_COMMAND:**<br>• The GET MODE SEND_COMMAND reveals the active system (IR, Serial, or Data) settings.<br>**SET MODE SEND_COMMAND:**<br>• The SET MODE SEND_COMMAND changes the active system settings.<br>For further information, see “IR SEND_COMMANDs” on page 76. |

| Quick Reference Table 3 – Modes for Handling Video and Video Processing | |
|---|---|
| **Mode** | **Description** |
| **Scaling Mode** | Scaling Mode refers to how the system alters or maintains a source device’s resolution as it is passed along to the destination device. The Scaling Mode can be set on the DXLink Fiber RX with the Scaling button (see page 50), or with SEND_COMMANDs (see page 68), or though DGX Configuration Software when scaling is being done via an Enova DXLink Fiber Output Board.<br>**Auto Mode (Default):**<br>• Auto Mode (SmartScale®) allows the destination device to choose the resolution it needs.<br>**Manual Mode:**<br>• Manual Mode allows the user to configure the resolution the video will display through a destination device.<br>**Bypass Mode:**<br>• Bypass Mode allows the video signal to display over the destination device without altering the signal’s resolution. |

# DXLink Fiber Specifications

## Applicability

The specifications in this chapter apply to the following DXLink Fiber Transmitters and Receivers, Duplex:

- FG1010-360 – DXLink Multi-Format SM Fiber TX, Duplex
- FG1010-362 – DXLink Multi-Format MM Fiber TX, Duplex
- FG1010-560 – DXLink HDMI SM Fiber Receiver, Duplex
- FG1010-562 – DXLink HDMI MM Fiber Receiver, Duplex

## Specifications – DXLink Fiber Transmitters and Receivers, Duplex

| General Specifications | |
|---|---|
| **Parameter** | **Value** |
| AC Power | 100 to 240 VAC single phase, 50 Hz to 60 HZ<br>0.8 A max. (100 to 240 VAC) |
| Included Power Supply Output | 2.5 A at 12 V, max 13.5 V |
| Power Consumption (max.) | Multi-Format TX 20 W, HDMI RX 19 W |
| Thermal Dissipation (max.) | Multi-Format TX 69 BTU/hr, HDMI RX 65 BTU/hr |
| Power Connector | 2.1 mm DC power jack |
| Operational Temperature | 32° F to 104° F (0° C to 40° C) |
| Storage Temperature | -22° F to 158° F (-30° C to 70° C) |
| Operational Humidity | 5 to 85% RH (non-condensing) |
| Storage Humidity | 0 to 90% RH (non-condensing) |
| Dimensions<br>Depth<br>Width<br>Height | <br>5.15 in. (13.08 cm)<br>8.71 in. (22.12 cm)<br>1.00 in. (2.54 cm) |
| Weight | Approximately 1.1 lb. (0.5 kg) |
| Shipping Weight | Approximately 2.2 lb. (1.0 kg) |
| Mounting Options | Compatible with all V Style versatile mounting options including rack, surface, or pole (for V Style Mounting kits, see www.amx.com) |
| MTBF | 124,232 hours |
| Safety Certifications | Class 1 Eye Safe per requirements of IEC 60825-1 / CDRH |
| Transport Layer Throughput | 10.3125 Gbps |
| Fiber Transceiver Type | 10G SFP+ |
| Fiber Connector | LC Duplex conforming to ANSI TIA-EIA 604-10 (FOCIS 10A) |
| Fiber Cable Types and Supported Length | • Single mode – Duplex 9/125 µm @ 6.21 miles (10 km)<br>• Multimode – Duplex OM3 50/125 µm @ 984 ft. (300 m) |
| Optical Wavelength | • Single mode – 1310 nm<br>• Multimode – 850 nm |
| Single Mode Optical Budget | • 7.4 dB (typical) between DXLink Fiber Transceivers<br>• Optical Modulation Amplitude (OMA): -5.2 dBm (min.)<br>• Optical Modulation Amplitude (OMA) sensitivity: -12.6 dBm (typical) |
| Single Mode Optical Transceiver Mean Output Power | -8.2 dBm to 0.5 dBm (average power) |
| Multimode Optical Budget | • 6.8 dB (typical) between DXLink Fiber Transceivers<br>• Optical Modulation Amplitude (OMA): -4.3 dBm (min.)<br>• Optical Modulation Amplitude (OMA) sensitivity: -11.1 dBm (typical), |
| Multimode Optical Transceiver Mean Output Power | -1 dBm (average power) |

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| General Specifications (continued) | |
|---|---|
| Noise Level | 0 dBA @1m (typical), 45.3 dBA @ 1m (max) |
| Airflow | Convection (openings on top of case, typical); forced air (out of front plate, when fan is active). |
| Approvals | UL 60950-1, CSA 60950-1, IEC 60950-1, CE EN 60950-1, CE EN 55022 Class A, CE EN 55024, FCC CFR Title 47 Part 15 Subpart B Class A, ICES-003 Class A, RoHS, WEEE |
| **Other AMX Equipment** | |
| AMX Products Compatible with DXLink Fiber Transmitters, Duplex | Enova DGX Digital Media Switchers |
| AMX Products Compatible with DXLink Fiber Receivers, Duplex | Enova DGX Digital Media Switchers |
| Included Accessories | • Desktop power supply (ENERGY STAR® qualified): 1 per unit<br>**Caution:** *Only the provided desktop power supply should be used, and it must not be altered in any way.* |
| Compatible / Optional Equipment | • CC-NIRC, NetLinx Emitter Cable (FG10-000-11)<br>• IR03, External IR Receiver Module (FG-IR03)<br>• CC-MINIUSB, Mini USB to PC cable adapter (FG5967-20): use with DXLink Fiber RX only – for connecting a keyboard/mouse device<br>• CC-USB, USB programming cable (FG10-5965): use with DXLink Fiber TX only – for connecting to a PC |

**Compatibility Note:** *In Enova DGX systems using duplex fiber technology – the DXLink Fiber Input Board and its DXLink Fiber TX, Duplex must have the same type of fiber optic transceiver: either multimode or single mode. The same holds true for DXLink Fiber Output Boards and the DXLink Fiber RX, Duplex units.*

| NetLinx and Control Specifications | |
|---|---|
| ICS LAN / Ethernet Port | • TCP/IP port (ICS LAN 10/100)<br>• RJ-45 connector |
| Serial Port | • Bidirectional RS-232<br>• Standard NetLinx baud rate 1200 to 115k<br>• Parity support: Odd/Even/None<br>• 3.5 mm pluggable Phoenix terminal block |
| IR Control Port | • Port for use with IR03 External IR Receiver (optional accessory FG-IR03)<br>• Port for use with CC-NIRC NetLinx Emitter (optional accessory FG10-000-11) |
| Advanced Configuration Interface | USB mini-B connector (Program port) |
| ID Pushbutton | • Toggle between DHCP and static IP addressing<br>• Places system in NetLinx Device ID assignment mode<br>• Reset the factory default settings<br>• Restore the factory firmware image |

| USB (HID) Keyboard and Mouse Specifications | |
|---|---|
| USB (HID) TX | • (1) USB mini-A/B connector (“Host”)<br>• Connect a DXLink Fiber TX to a PC and emulate keyboard and mouse commands from a DXLink Fiber Receiver or a DXLink Twisted Pair Receiver |
| USB (HID) RX | • (1) USB mini-A/B connector (“Device”)<br>• Connect a keyboard and mouse and send commands to a PC connected to a DXLink Fiber Transmitter or a DXLink Twisted Pair Transmitter |

**Note:** *A list of HID devices which have been tested and found to be working well with the latest firmware is available (see “DXLink - HID supported Devices” on the DXLink Fiber Receiver’s product page).*

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| HDMI Specifications | |
|---|---|
| Compatible Formats | HDMI, HDCP, DVI (DVI requires conversion cable) |
| Signal Type Support | • HDMI<br>• DVI-D (Single Link via a DVI-to-HDMI cable adapter)<br>• DisplayPort++ (input only with HDMI or DVI cable adapter) |
| Video Data Rate (max.) | 4.95 Gbps / 5.568 Gbps^ |
| Video Pixel Clock (max.) | 165 MHz / 185.625 MHz^ |
| Progressive Resolution Support | 480p up to 1920x1200 @ 60 Hz (supported resolutions are listed in the “Supported Input Resolutions” appendix; see page 119) |
| Interlaced Resolution Support | 480i, 576i, 1080i (supported resolutions are listed in the “Supported Input Resolutions” appendix; see page 119) |
| Deep Color Support | 24 bit, 30 bit^ |
| Color Space Support | RGB 4:4:4<br>YCbCr^^ 4:4:4 and 4:2:2 |
| 3D Format Support | Yes^^^ (HDMI Primary Formats)<br>• Frame Packing 1080p up to 24 Hz<br>• Frame Packing 720p up to 50/60 Hz<br>• Frame Packing 1080i up to 50/60 Hz<br>• Top-Bottom 1080p up to 24 Hz<br>• Top-Bottom 720p up to 50/60 Hz<br>• Side-by-Side Half 1080i up to 50/60 Hz |
| Audio Format Support | Dolby TrueHD, Dolby Digital*, DTS-HD Master Audio, DTS*, 2 CH L-PCM, 6 CH L-PCM, 8 CH L-PCM |
| Audio Resolution | 16 bit to 24 bit |
| Audio Sample Rate | 32 kHz, 44.1 kHz, 48 kHz, 96 kHz, 192 kHz |
| Local Audio Support | TX insertion, RX extraction |
| HDCP Support | Yes<br>• Supports AMX HDCP InstaGate Pro® Technology.<br>• When used with an Enova DGX Digital Media Switcher, the key support is up to 16 sinks per output, independent of the source device. |
| CEC support | CEC is not currently supported |

^ Only supported when the DXLink Fiber HDMI RX scaler is in Bypass Mode using CEA-861 formats and the resolution is 1080p60 or less.

^^ Input signal support for YCbCr 4:4:4 and 4:2:2; output color-space is converted to RGB 4:4:4.
^^^ The Scaler on corresponding output board must be set to Bypass Mode.
* Dolby Digital and DTS support up to 48 kHz, 5.1 channels.

**Note:** *Interlaced and progressive video are supported into the Transmitter; progressive is only supported out of the Receiver unless in non-scaling Bypass Mode.*

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| HDMI Specifications (continued) | |
|---|---|
| **DXLink Fiber TX** | |
| Input Signal Type | • HDMI<br>• DVI-D (Single Link with a DVI-to-HDMI cable adapter)<br>• DisplayPort ++ (input only with HDMI cable adapter) |
| Local Loopback Output | DVI-D, non-scaling (Single Link with cable adapter) |
| Local Loopback Output +5 V DDC Pin | 55 mA |
| DDC/EDID Support | • When the TX is connected to an Enova DGX Digital Media Switcher, the HDMI and VGA EDIDs are synchronized with the persisted EDIDs on the DXLink Fiber Input Board and are user re-programmable.<br>• For the specific EDID list, see the specifications in the “Enova DGX DXLink Fiber Boards” chapter in the *Installation Manual – Enova DGX 8/16/32/64*. |
| Input Voltage (nominal) | 1.0 Vpp differential |
| Input Re-clocking (CDR) | Yes |
| Input Equalization | Yes, adaptive |
| Input Connector | HDMI Type A female |
| Local Loopback Output Connector | HDMI Type A female |
| Propagation Delay (typical) | 4.8 µs |
| **DXLink Fiber RX** | |
| Output Signal Type | • HDMI<br>• DVI-D (Single Link with cable adapter) |
| Output Scaling | SmartScale®, Manual Configuration, Bypass |
| SmartScale® Output Resolution Support | All resolutions between 480p and 1920x1200 @ 60 Hz via automatic SmartScale® query of the display’s preferred EDID detailed timing definition. |
| Output Nominal Voltage | 1.0 Vpp differential |
| Output Re-clocking | Yes |
| +5 V DDC Pin Output | 55 mA |
| +5 V USB Output | 500 mA |
| Output Rise Time / Fall Time | 425 ps typical (20% to 80%) |
| Output Connector | HDMI Type A female |
| Propagation Delay (typical) | 26 ms when scaling; 5.2 µs when in Bypass Mode |
| HDMI Audio Synchronization | Video formats @ 60 Hz frame rate: in Scaling Mode, audio leads video by 12 ms typical (4 ms to 20 ms). In Bypass Mode, audio lags video by 17 ms. |

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| Analog Video Specifications | |
|---|---|
| **DXLink Fiber TX** | |
| Compatible Formats | • RGBHV, RGBS, RGsB<br>• Y/Pb/Pr (HDTV)<br>• Y/C (S-Video), C (Composite) |
| Progressive Resolution Support | 480p up to 1920x1200 @ 60 Hz (supported resolutions are shown in the manual's “Supported Input Resolutions” appendix; see page 119) |
| Interlaced Resolution Support* | 480i, 576i, 1080i (supported resolutions are shown in the manual's “Supported Input Resolutions” appendix; see page 119) |
| Auto-Adjust Input | Supported |
| RGB Input Signal Level Range | 1 Vpp nominal |
| RGB Input Impedance | 75 ohm |
| HV Sync Input Signal Level Range | 2 to 5 Vpp |
| HV Sync Input Impedance | 2.5 pF typical, 10 pF max. |
| Digital Processing | 24 bit, 165 MHz |
| Y/Pb/Pr Input Signal Level Range | • 1.0 Vpp for Y<br>• 700 mVpp for Pb, Pr |
| Y/Pb/Pr Input Impedance | 75 ohm |
| Y/C (S-Video) Input Signal Level Range | • 1.0 Vpp for Y<br>• 1.0 Vpp for c |
| Y/C (S-Video) Input Impedance | 75 ohm |
| C (Composite) Input Signal Level Range | 1.0 Vpp |
| C (Composite) Input Impedance | 75 ohm |
| Input Connector | HD-15 (breakout cable required for non-RGB formats) |

* Interlaced video is supported into the Transmitter; progressive is only supported out of the Receiver unless in Scaler Bypass Mode.

AMX reserves the right to modify its products and their specifications without notice.

| Local Audio Specifications | |
|---|---|
| **DXLink Fiber TX** | |
| Input Signal Types | • Stereo analog, S/PDIF<br>• Video signal must be present to pass audio |
| Analog Input Level (max.) | +2.5 dBu, unbalanced |
| Analog Input Impedance | 10 kohms |
| Analog to Digital Conversion | 48 kHz sample rate, 24-bit |
| S/PDIF Audio Format Support | Dolby Digital*, DTS*, 2 CH L-PCM |
| S/PDIF Resolution | 16 bit to 24 bit |
| S/PDIF Sample Rate | 32 kHz, 44.1 kHz, 48 kHz, 96 kHz |
| S/PDIF Input Signal Level Range | 200 mVpp to 600 mVpp terminated |
| S/PDIF Input Impedance | 75 ohm |
| Analog to Digital Reference Level | +2.5 dBu = 0 dBfs |
| Input Connector | • 3.5 mm mini-stereo jack (analog stereo)<br>• RCA jack (S/PDIF) |
| **DXLink Fiber RX** | |
| Output Signal Types | Stereo analog |
| Analog Output Level (max.) | 0 dBu, unbalanced, >= 2 kohm load |
| Analog Output Frequency Response | <+0 dB to -0.5 dB, 50 Hz to 20 kHz |
| Analog Audio Output THD+N | <0.04%, 1 kHz, -10 dBu to +2 dBu |
| Analog Audio Out SNR | >93 dB, 20 Hz to 20 kHz, Vin = +2 dBu |
| Digital to Analog Reference Level | 0 dBfs = +0 dBu |
| Audio Synchronization | Video formats @ 60 Hz frame rate: In Scaling Mode, audio leads video by 12 ms typical (4 ms to 20 ms). In Bypass Mode, audio lags video by 17 ms. |
| Output Connector | 3.5 mm mini-stereo jack (analog stereo) |

* Dolby Digital and DTS support up to 48 kHz, 5.1 channels.

AMX reserves the right to modify its products and their specifications without notice.

# Installation and Setup

## Site Recommendations

When placing the DXLink Fiber, Duplex units in an installation, follow the recommendations and precautions in this section to reduce potential setup and operation hazards.

### Environment

- ❑ Choose a clean, dust free, (preferably) air-conditioned location.
- ❑ Avoid areas with direct sunlight, heat sources, or high levels of EMI (Electromagnetic Interference).

### DXLink Fiber Transmitter and Receiver Accessibility

Make sure the front of each unit is accessible, so that you can monitor the LED indicators. Leaving adequate clearance at the rear will also allow for easier cabling and service.

### Power

The power source's electrical outlet should be installed near the unit, easily accessible, and properly grounded. Power should come from a building branch circuit. To avoid an overload, note the power consumption rating of all the equipment connected to the circuit breaker before applying power.

## General Hazard Precautions

These recommendations address potential hazards that are common to all installations.

### Elevated Operating Temperature

The maximum rated ambient temperature is 104° F (40° C) for the DXLink Fiber, Duplex units. All equipment should be installed in an environment compatible with the manufacturer's maximum rated ambient temperature. In a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the ambient room temperature.

**Caution:** *To protect the equipment from overheating, do not operate in an area that exceeds 104° F (40° C) and follow the clearance recommendation below for adequate airflow.*

### Airflow Restriction

The DXLink Fiber, Duplex units are designed to adequately dissipate the heat they produce under normal operating conditions; however, this design is defeated when high heat producing equipment is placed directly above or below the them.

**Important:** *Do not place the unit in a confined space with no airflow; thermal runaway can result and the unit will overheat.*

**Caution:** *To prevent overheating, avoid placing high heat producing equipment directly above or below the units. We recommend allowing plenty of clearance above the vent holes on top of the units. Do not place anything directly on top of the units that would restrict airflow through the vent holes on top.*

### Reliable Earthing (Grounding)

Reliable earthing of rack-mounted equipment should be maintained. If not using a direct connection to the branch circuit (e.g., plugging into a power strip), pay particular attention to supply connections.

### Unpacking Tips

- ❑ Before fully unpacking the Transmitters and Receivers, *inspect the shipping box(es) for any signs of damage*. If a box is partially crushed or any sides have been broken open, notify the shipping agency immediately and contact your AMX representative (see the warranty at www.amx.com).
- ❑ Once unpacking is complete, closely check the physical condition of the units.
- ❑ Collect all documentation.

**Note:** *Please save the original shipping container and packing materials. AMX is not responsible for damage caused by insufficient packing during return shipment to the factory. Shipping boxes are available; for details, contact your AMX representative.*

## Setup Information

### Setup Requirements

- A PC with NetLinx Studio (v3.3 or later) installed
- An understanding of which DXLink Fiber Mode the system will be used in (below and page 26)
- An understanding of the DIP switch settings (page 38)

**Important:** *We recommend that DXLink Fiber equipment be installed by a technician with knowledge of networks and experience with NetLinx Studio and its Telnet interface. NetLinx experience should include changing device addresses, binding devices, updating firmware, etc.*

The remainder of the "Setup Information" section covers information for system setup, network loop concerns, DIP switch settings, mounting options, cable requirements and recommendations, and "audio type" precedence.

**Endpoint Mode (Switcher)** – One or more Transmitters and/or Receivers are connected to an Enova DGX Switcher containing an integrated Master (see page 35). The Transmitters and Receivers can be either multimode or single mode as long as each one's transceiver matches the fiber optic transceivers on the DXLink Fiber Input or Output Board it is attached to.

**Important:** *Use of a DXLink Fiber Transmitter and Receiver as a standalone pair will be supported in a future firmware upgrade.*

### Endpoint Mode (Switcher): Example of Typical System Setup

The primary function of the DXLink Fiber Transmitters and Receivers, Duplex is to work with compatible DXLink Fiber equipment as an endpoint solution for transmission of HDMI or analog video signals over fiber optic cable (or DVI-D signals via a DVI-to-HDMI cable).

The DXLink Fiber Transmitter receives an HDMI signal and an audio signal from a source device. The audio can be either digital audio embedded with the HDMI signal or analog stereo audio. Both the video and embedded audio are transmitted over fiber optic cable to a fiber optic transceiver on the DXLink Fiber Input Board. The HDMI signal is then routed through any (or all) of the fiber optic transceivers on one or more output boards. The HDMI signal can also be routed through any other types of boards in the system.

When the HDMI signal is routed through a fiber optic transceiver on a DXLink Fiber Output Board to a DXLink Fiber Receiver, the Receiver sends the HDMI signal with embedded audio on to the destination device. The audio can also be output on the Receiver's stereo audio port.

In a system where DXLink Fiber Transmitters and Receivers are used in conjunction with an Enova DGX 8/16/32/64, the cable runs from a Transmitter to a DXLink Fiber Input Board and from a DXLink Fiber Output Board to a Receiver depend on the quality of the cable (see cable specifications on page 28).

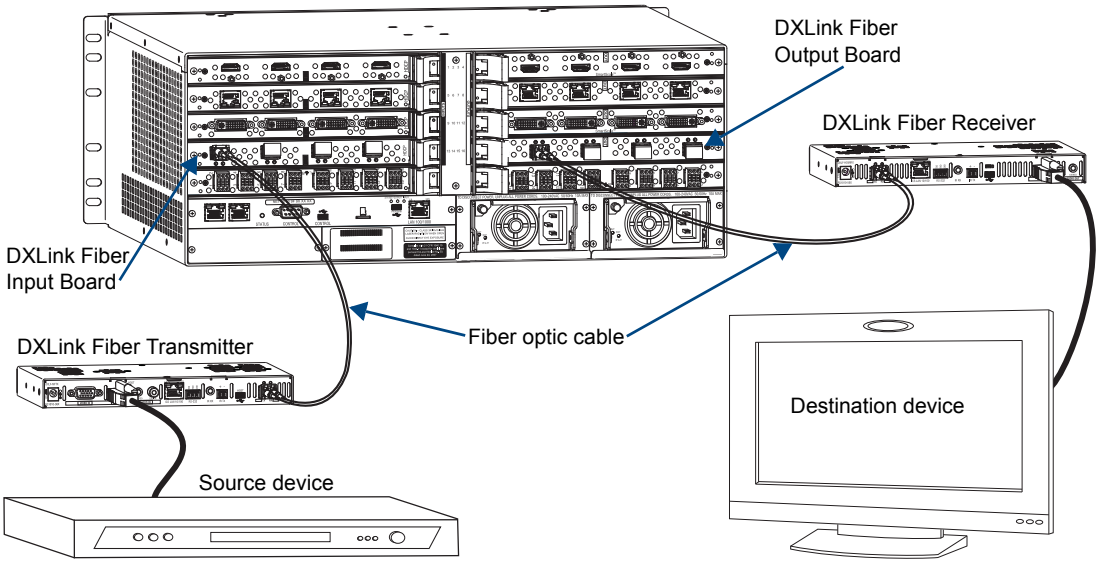



**FIG. 9** Endpoint Mode (Switcher) setup with Enova DGX 16

**Tip:** *For systems with special requirements – Before installing in the final location, place the equipment close together, so that the destination monitor and a PC for control can be seen simultaneously if adjustments are necessary. Scaling adjustments can be made using SEND_COMMANDs (see page 66). For Enova DGX Digital Media Switcher systems, DGX Configuration Software can also be used to make scaling adjustments via the switcher (see the switcher's "Instruction Manual").*

### *Custom EDID Settings*

If your system has special EDID requirements, see page 130 for information on managing and programming custom EDIDs.

### *Options for System Setup with Enova DGX DXLink Fiber Boards*

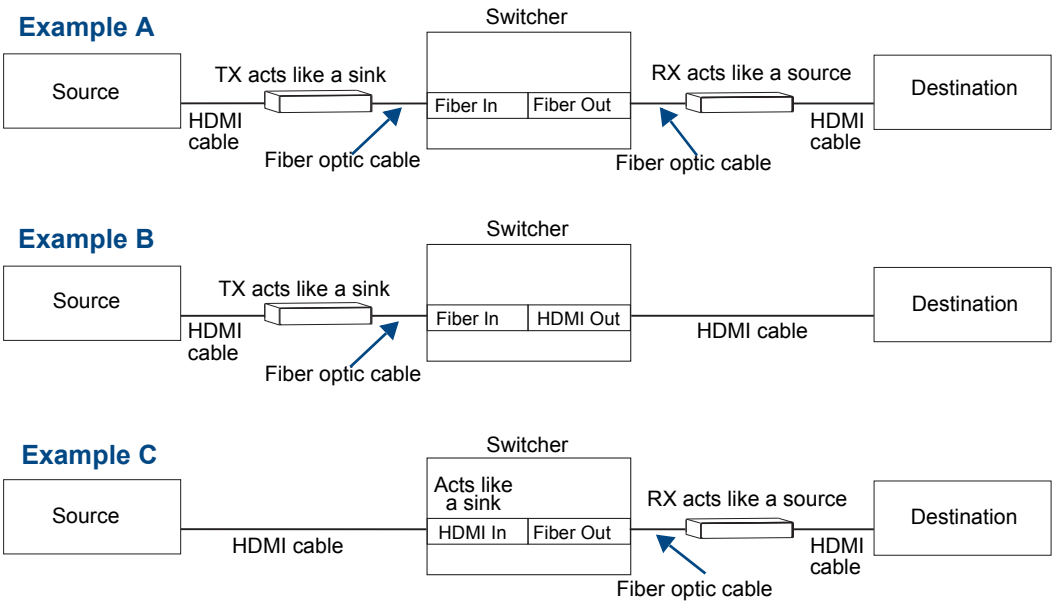
The following table contains options for using DXLink Fiber Transmitters and Receivers in conjunction with DXLink Fiber Input and Output Boards in an Enova DGX Digital Media Switcher.

| System Setup Options - Enova DGX DXLink Fiber Boards with DXLink Fiber TXs and RXs | | | |
|---|---|---|---|
| **DXLink Fiber TX** | **Enova DGX Input Board** | **Enova DGX Output Board** | **DXLink Fiber RX** |
| SMF-D TX → | DXLink Fiber SMF-D → | DXLink Fiber SMF-D → | SMF-D RX |
| SMF-D TX → | DXLink Fiber SMF-D → | DXLink Fiber MMF-D → | MMF-D RX |
| SMF-D TX → | DXLink Fiber SMF-D → | Any board → | Not applicable |
| MMF-D TX → | DXLink Fiber MMF-D → | DXLink Fiber MMF-D → | MMF-D RX |
| MMF-D TX → | DXLink Fiber MMF-D → | DXLink Fiber SMF-D → | SMF-D RX |
| MMF-D TX → | DXLink Fiber MMF-D → | Any board → | Not applicable |
| Not applicable | Any board → | DXLink Fiber SMF-D → | SMF-D RX |
| Not applicable | Any board → | DXLink Fiber MMF-D → | MMF-D RX |

### *Functions of DXLink Fiber Transmitters and Receivers*

The diagram in FIG. 10 below shows the functions of DXLink Fiber Transmitters and Receivers. The example descriptions contain the device's HDCP key count when used in conjunction with DXLink Fiber Boards in an Enova DGX Digital Media Switcher.

**Important:** *The DXLink Fiber TX and the DXLink Fiber Input Board must have the same type of fiber optic transceiver. The DXLink Fiber Output Board and the DXLink Fiber RX must have the same type of fiber optic transceiver. The multimode and single mode fiber optic transceivers allow for in-the-field replacement and can even be swapped as long as these constraints are followed.*




**Example A:** When a Receiver acts like a source, its key does not count. Source device sees 1 key (Transmitter).
**Example B:** When a Transmitter acts like a sink, the source device sees 1 key (Transmitter).
**Example C:** When a source device is connected directly to a switcher, the source sees 1 key (switcher input).

**FIG. 10** The repeater and source functions of DXLink Fiber Transmitters and Receivers

## Avoiding Network (Ethernet) Loops

**Caution:** *Be careful not to create a network (Ethernet) loop.*

Only one connection to a LAN is permitted within a switching system with DXLink Fiber support. *Network loops must be avoided* (see FIG. 11).

### *Example*

In the example in FIG. 11, a network loop was created when the Enova DGX 16 was connected to a LAN and one of its DXLink Fiber Transmitters was connected to the same LAN. The Transmitter must be disconnected from the LAN. The same problem would also occur if an enclosure and one (or more) of its DXLink Fiber Receivers were connected to a common LAN. *Remember to avoid network loops.*

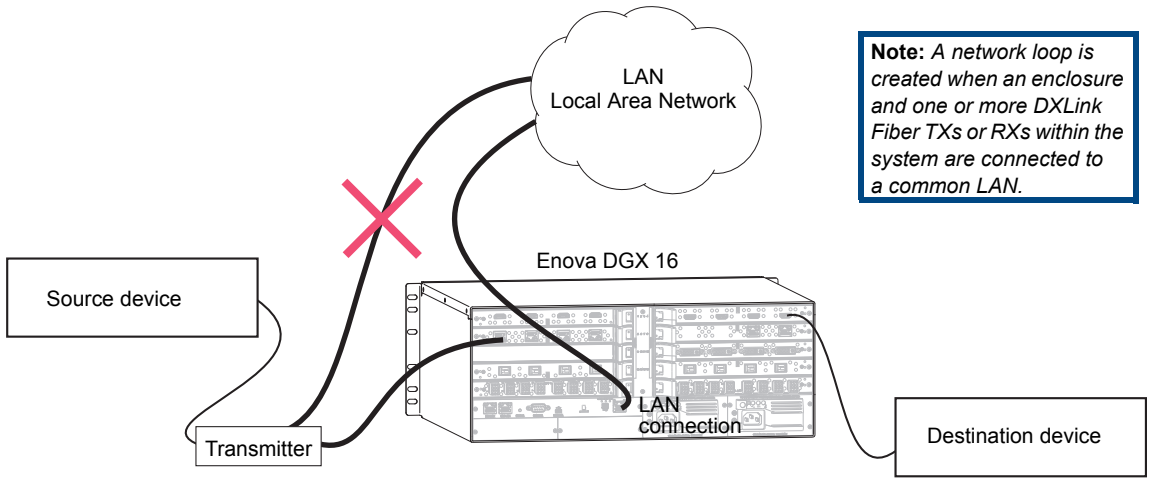

LAN
Local Area Network
Note: A network loop is created when an enclosure and one or more DXLink Fiber TXs or RXs within the system are connected to a common LAN.
Source device
Enova DGX 16
LAN
connection
Transmitter
Destination device

**FIG. 11** Avoid network loops

## DIP Switch Location

**Tip:** *For easiest access to the DIP switch toggles, we recommend setting them before installation.*

**Important:** *When setting the DIP switch toggles, make sure any toggles that need to be ON are flipped toward the AMX sticker.*

DIP switch toggles for enabling/disabling special Receiver/Transmitter functionality are located on the bottom of the Receiver and the Transmitters.

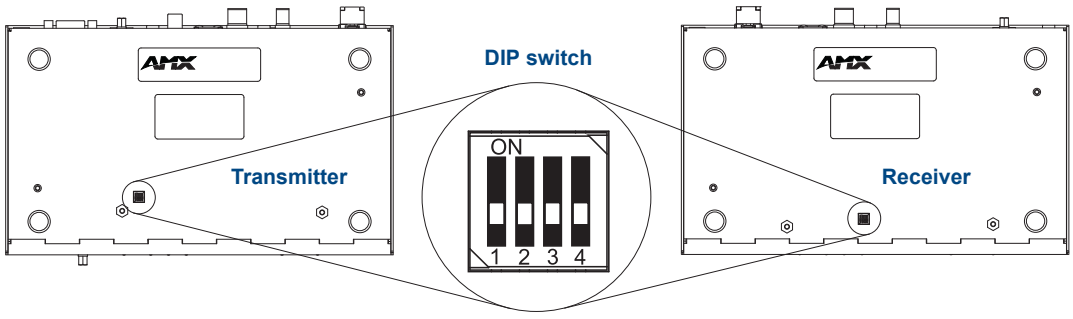



**FIG. 12** DIP switch on bottom of Transmitters and Receivers

**Important:** *DIP switch settings on all DXLink Fiber units are read only on reboot. After the settings are read, any adjustment of the toggles will not be implemented and will not affect the system.*

## Setting DIP Switch #1 to Enable/Disable Access to ICS LAN 10/100 Port

The #1 Toggle is used for enabling/disabling network activity over the physical ICS LAN 10/100 port. It does not affect network activity over the DXLink Fiber connection. (For SEND_COMMANDs used to disable/enable ICS LAN functionality, see page 84.)

**Tip:** *Common setup scenarios and their DIP switch settings are provided in a table on page 40.*

### *#1 Toggle Settings*

- **OFF** (default) – When the #1 Toggle is set to OFF, network activity over the ICS LAN 10/100 port is disabled.
- **ON** – When the #1 Toggle is set to ON, network activity over the ICS LAN 10/100 port is enabled.

### *Toggle #1 Set to ON*

When a Transmitter or Receiver is connected to a DXLink Fiber input or output on an Enova DGX Digital Media Switcher, the switcher provides a network connection allowing the Transmitter or Receiver to appear in the OnLine Tree in NetLinx Studio (#3 Toggle *must* be set to ON). For connecting the Transmitter or Receiver to other equipment using the ICS LAN 10/100 port, the #1 Toggle must be set to ON.

**Caution:** *Because the DXLink Fiber connection carries network activity passed from the switcher, do not connect the ICS LAN 10/100 port on the Transmitter or Receiver to the same LAN as the switcher because a network loop will result. For information on avoiding network loops, see page 38.*

## Setting DIP Switch #2

The #2 Toggle is reserved for future functionality. **Be sure that it is set to OFF.**

## Setting DIP Switch #3 for Network Connectivity

The #3 Toggle is used for enabling/disabling network connectivity of the DXLink Fiber Transmitter or Receiver. If enabled it allows the Transmitter or Receiver to be configured to connect to a NetLinx Central Controller (used for controlling the DXLink unit and allowing Ethernet traffic).

**Tip:** *Common setup scenarios and their DIP switch settings are provided in a table on the next page.*

### *#3 Toggle Settings*

- **OFF** (default) – When the #3 Toggle is set to OFF, the Transmitter or Receiver will not try to connect to the network and will not acquire an IP address.
- **ON** – When the #3 Toggle is set to ON, the Transmitter or Receiver will attempt to connect to the network via DHCP or static IP, depending on how the unit has been set up (see page 49). The Transmitters and Receivers will not display in NetLinx Studio and will not accept commands or queries unless the #3 Toggle is ON.

**Note:** *After the #3 Toggle is set to ON, a network connection is established, and the NetLinx Studio screen is refreshed, Transmitters and Receivers display in the OnLine Tree as Unbound NDP (Network Detect Proxy) Devices. To facilitate IRL and KIT file transfers, they can be bound to the integrated NetLinx Master in the switcher or to another NetLinx Master. A Virtual NetLinx Master can also be used for file transfers.*

## Setting DIP Switch #4

The #4 Toggle is reserved for future functionality. **Be sure that it is set to OFF.**

## Scenarios / DIP Switch Settings Table

The table below contains the most common scenarios for setting up Transmitters and Receivers with an Enova DGX 8/16/32/64.

**Find the scenario in the table that you want to use and then set the DIP switches accordingly.** A detailed explanation of functions for each toggle is provided on the previous page.

**Important:** *Be sure that Toggles #2 and #4 are set to OFF.*

**Tip:** *Each toggle's ON position is toward the connectors on the rear of the DXLink Fiber units (see page 38).*

| Common Scenarios and Their DIP Switch Toggle Settings | | | | |
|---|---|---|---|---|
| **Switcher Setup – TX/RX with Enova DGX Switcher** | **#1** | **#2** | **#3** | **#4** |
| AV signals only | OFF | OFF | OFF | OFF |
| AV with Ethernet pass through to networked device* | ON | OFF | OFF | OFF |
| AV with NetLinx control of TX/RX unit and serial/IR ports | OFF | OFF | ON | OFF |
| AV with NetLinx control of TX/RX unit and serial/IR ports, plus Ethernet pass through to networked device* | ON | OFF | ON | OFF |

* Connect the ICS LAN 10/100 port of the DXLink Fiber unit to the network device (e.g., laptop, IP controlled projector, AMX ICSLan EXB Device).

## Mounting Options for DXLink Fiber Units (Rack Trays and Mounting Brackets)

**Caution:** *To prevent overheating, avoid placing high heat producing equipment directly above or below the units. We recommend allowing plenty of clearance above the vent holes on top of the units. Do not place anything directly on top of the units that would restrict airflow through the vent holes on top.*

The DXLink Fiber Transmitters and Receivers, Duplex are classified as V Style modules, which have optional V Style mounting hardware. These versatile mounting options include rack trays and mounting brackets for desktops, under desks, on walls, and on poles. For details on V Style Mounting Kit options, see www.amx.com.

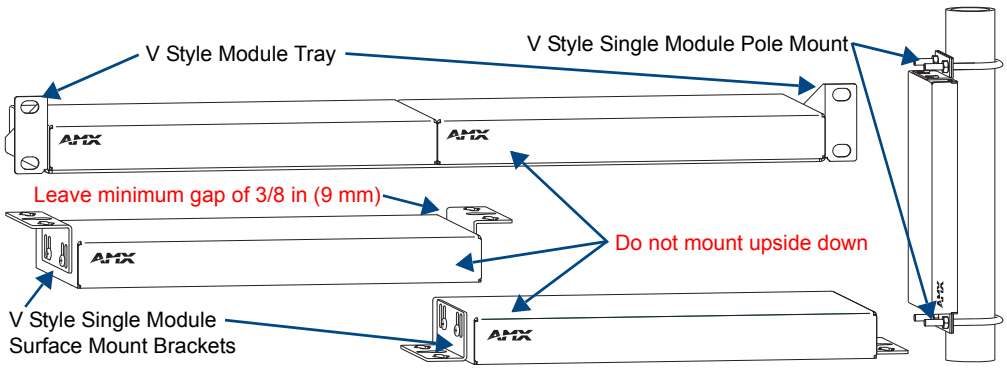

V Style Module Tray
V Style Single Module Pole Mount
Leave minimum gap of 3/8 in (9 mm)
Do not mount upside down
V Style Single Module
Surface Mount Brackets

**FIG. 13** V Style mounting hardware

**Important:** *When mounting under a surface, the DXLink Fiber unit should be mounted upright and lowered in the slots to provide an airflow gap between the surface and the vent holes. If not using V Style brackets, be sure to leave a gap between the top of the unit and the surface for heat to escape.*

## Fiber Optic Cable Requirements

**Warning:** *DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 13).*

### *Fiber Optic Cable Requirements*

- Fiber optic cable with LC termination for snap coupling with SFP+ transceivers
- LC Duplex conforming to ANSI TIA-EIA 604-10 (FOCIS 10A)
- MM duplex units require OM3 50/125 µm multimode fiber optic cable; maximum length 984 feet (300 m)
- SM duplex units require 9/125 µm single mode fiber optic cable; maximum length is 6.21 miles (10 km)

**Caution:** *Do not severely bend or kink the fiber optic cable. Irreversible damage can occur. Refer to the physical limitations (bend radius) specified by the cable manufacturer.*

**Important:** *Be sure to follow the fiber optic cable manufacturer's recommendations.*

**Tip:** *Multimode transceivers only – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable **away from you** and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if signal is being passed (works on some digital cameras).*

### *Fiber Optic Cable Wiring for Bidirectional Full System Capabilities*

When wiring fiber optic cable for bidirectional full system capabilities, a dual set of fiber optic cables is used to wire from a DXLink Fiber Transmitter to a DXLink Fiber Input Board and another dual set of fiber optic cables from a DXLink Fiber Output Board to a DXLink Fiber Receiver. This wiring provides not only video and audio but Ethernet, IR, serial, and USB functionality as well.

### *Fiber Optic Transceiver LEDs*

The following information applies to the LEDs above the fiber optic transceiver on the units.

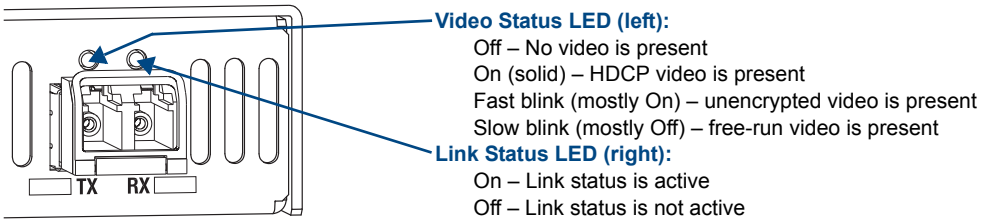

TX
RX
Video Status LED (left):
Off – No video is present
On (solid) – HDCP video is present
Fast blink (mostly On) – unencrypted video is present
Slow blink (mostly Off) – free-run video is present
Link Status LED (right):
On – Link status is active
Off – Link status is not active

**FIG. 14** Fiber optic transceiver LEDs

## Twisted Pair Cable for ICS LAN 10/100 Connection

### *Cable Pinout*

Either T568A or T568B pinout specification for termination of twisted pair cable can be used for ICS LAN 10/100.

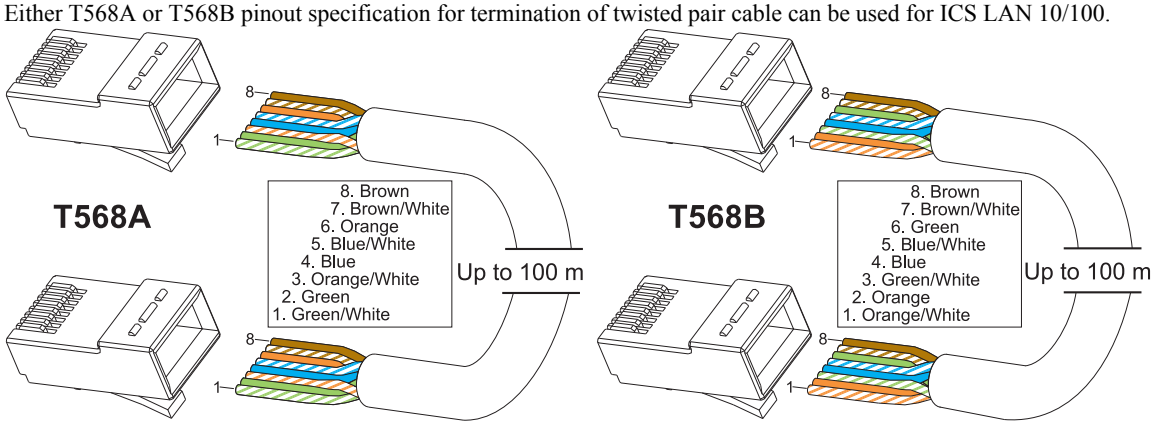



**FIG. 15** Twisted pair cable pinouts for Ethernet connectors

### *ICS LAN 10/100 Connector LEDs*

The following information applies to the LEDs on the ICS LAN 10/100 (RJ-45) connector on the units.

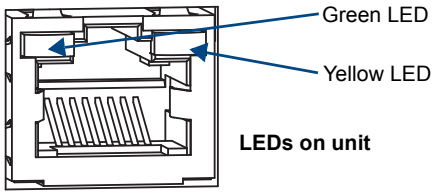



**FIG. 16** ICS LAN 10/100 connector LEDs

- **Link/Activity (L/A) Green LED:**
  - On – Link status is active (when the Ethernet cable is connected and terminated correctly)
  - Off – Link status is not active
- **Speed Status (SPD) Yellow LED:**
  - On – Speed status is 100 Mbps
  - Off – Speed status is 10 Mbps

## Audio Type Precedence

The connectors for bringing audio into the system on the Transmitters are as follows:

- HDMI In connector – Embedded audio signal
- Digital Audio In jack – Digital audio signal (S/PDIF)
- Stereo Audio In jack – Analog stereo audio signal

The hierarchy for audio type precedence* is listed in the following table for the Transmitters:

**Audio Type Precedence on DXLink Fiber Transmitters, Duplex**

| Incoming Signal | Audio Type Selected |
|---|---|
| HDMI w/ embedded digital audio | HDMI w/ embedded digital audio |
| S/PDIF digital audio only | S/PDIF digital audio |
| Stereo audio only | Stereo audio |
| S/PDIF digital audio and stereo audio | S/PDIF digital audio |
| HDMI w/ embedded digital audio and S/PDIF digital audio | HDMI w/ embedded digital audio |
| HDMI w/ embedded digital audio and stereo audio | HDMI w/ embedded digital audio |
| HDMI w/ embedded digital audio, S/PDIF digital audio, and stereo audio | HDMI w/ embedded digital audio |

* Audio precedence as specified in the table above is applicable when the AUDIN_FORMAT_AUTO command is set to ENABLE; this precedence can be overridden by SEND_COMMANDs (see page 76).

The audio selected by the Transmitter is embedded on the HDMI signal (if not already embedded) and sent to the switcher via the fiber optic cable.

The DXLink Fiber RX will by default take the embedded audio it receives from a Transmitter** and output the following types of audio:

- HDMI Out connector – Embedded digital audio signal
- Stereo Audio Out connector – Analog stereo audio signal

The audio output can be changed using the AUDOUT_FORMAT command (see page 70).

** These exceptions apply: In order for audio to be sent out of the analog stereo audio connector on the DXLink Fiber RX, it must have originated or be embedded in the HDMI signal on the Enova DGX Digital Media Switcher or DXLink Fiber Transmitter as a 2 channel signal (either analog stereo or 2 channel L-PCM). Multi-channel (>2 channel) L-PCM formats will pass incomplete audio (only 2 of the multiple channels will be sent). All other audio formats will be muted at the connector.

# DXLink Fiber TX – Attaching Signal, Transport, and Control Cables

**Important:** *Before attaching cables, be sure to set the DIP switch's toggles if necessary (see page 40).*

**Warning:** *DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 13).*

*Tips for Fiber Optic Connections:*

- ❑ Keep dust plugs in transceivers until you are ready to make a connection.
- ❑ Clean fiber optic cable ends before attaching to unit (be sure to follow the cable manufacturer's instructions for inspecting and cleaning the cable ends).
- ❑ Use gentle pressure when connecting fiber optic cables to transceivers (normally an audible click is heard when the connector engages).
- ❑ If unsure the connection is properly seated, gently tug on the connector.
- ❑ If fiber optic cables are removed from the transceivers, reinsert dust plugs.
- ❑ *Multimode transceivers only* – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable **away from you** and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if the signal is being passed (works on some digital cameras and cell phone cameras).

**Note:** *Power, IR, and RS-232 ports are covered in their own sections.*

## To attach signal, transport, and control cables to a DXLink Fiber TX, Duplex:

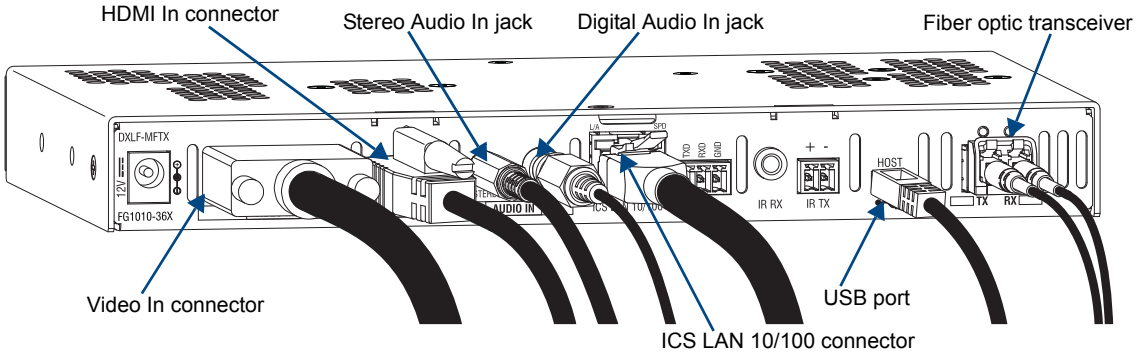



**FIG. 17** Attach signal and control cables

1. Video In connector – Attach the HD-15 cable from the source device to the Video In connector (for pinouts for VGA, component, S-Video, and composite, see page 117).
2. HDMI In connector – Attach the HDMI cable from the source device to the HDMI In connector.*
3. Clean the end face on the fiber cable following the manufacturer's recommendations.
4. Fiber optic transceiver – Remove the dust plug (save for further use).
5. Attach a fiber optic cable to the fiber optic transceiver for transport to the switcher. Always grasp the fiber connector housing to plug (or unplug) a fiber optic cable (depending on the housing, a click may be heard; if not, lightly tug to be sure the connection is tight).
6. Digital Audio In jack (optional) – Insert the S/PDIF (RCA) plug on the digital audio cable from the digital audio source into the Digital Audio In jack. For audio precedence information, see page 42.
7. Stereo Audio In jack (optional) – Plug in the analog audio cable from the stereo audio source into the Stereo Audio In jack. For audio precedence information, see page 42.

* DVI cable can be used instead (via a DVI-to-HDMI cable).

**Important:** *The illustration above shows duplex LC fiber cable; when using single LC fiber cables, be sure to verify that the individual wires from the transceiver's TX label on one end of the run are connected to the transceiver's RX label on the other end and vice versa.*

**Caution:** *When you make the connection in Step 8, be careful not to create a network loop (see page 38).*

8. ICS LAN 10/100 connector (optional) – Attach a twisted pair cable from this connector to a LAN. Note that the #1 Toggle on the DIP switch *must* be set to **ON** to enable this port.
9. Local Out port (optional) – On the front of the unit, attach an HDMI cable from a local monitor to the Local Out (HDMI) connector.
10. Program port (optional) – On the front of the unit, attach a USB mini-B cable from a PC to the Program port.
11. USB Host port (optional) – Attach USB cable from a PC to the Host USB-mini A/B port. The port's default is "enabled." The USB LED on the front monitors this port. For USB support information, see page 23. For USB SEND_COMMAND information, see page 82.
12. If necessary, set the video and audio formats using SEND_COMMANDs (for NetLinx programming information, see page 66).

**Note:** *When digital audio and/or analog stereo audio cables are plugged into the TX, the Audio LEDs on the front of the units turn green to show that audio is present and is being incorporated into the HDMI line and is also available on the DXLink Fiber RX at the Audio Out connector.*

**Note:** *The ID Pushbutton places the unit in ID Mode for setting the NetLinx ID (device only) and provides additional functionality, such as placing the device in Static IP Mode or DHCP Mode. For complete information, see page 57.*

## DXLink Fiber TX – Applying Power

**Caution:** *The provided desktop power supply must be used to power the DXLink Fiber TX, and it must not be altered in any way.*

### To apply power to the DXLink Fiber TX:

1. Plug the cord from the desktop power supply (provided) into the power jack on rear of the unit (2.1 mm DC jack for 12 V local power).
2. Plug the desktop power supply into an AC external power source.
   The Power LED on the front of the unit turns a constant green, which indicates a ready state. Some LEDs turn a constant color while some blink first. For normal LED display, see table below.

### DXLink Fiber Transmitters, Duplex – Indicator LEDs

The LED indicators are listed in the table as they appear on the front of the unit from left to right.

| DXLink Fiber TX LEDs | Normal Display | Indicates |
|---|---|---|
| Power | Green | Power is applied to the unit |
| Digital Video | Green | A digital signal is present through the unit |
| Audio | Green | A digital audio signal is present through the unit |
| Analog Video | One of the 3 LEDs is Green | Type of analog video present through the unit:<br>• C (composite) or Y/C (2 component)<br>• Y/PB/PR or RGB (3 component)<br>• RGBHV (5 component) or RGBS (4 component) |
| IR TX | Red | IR TX active communication |
| IR RX | Yellow | IR RX active communication |
| 232 (Serial) TX | Red | Serial TX active communication |
| 232 (Serial) RX | Yellow | Serial RX active communication |
| NetLinx Link/Act | Green | Active LAN connection to an AMX Network |
| NetLinx Status | Green | LAN connection is active |
| CEC | OFF | CEC is not currently supported |
| USB | Yellow | USB port connection is established |

### *DXLink Fiber Transmitters, Duplex – LED Troubleshooting*

If indicator LEDs for units do not respond with a normal display as stated in table on the previous page:

- Check all power connections.
- Check the "Detailed NetLinx (Link/Act and Status) LED Behavior" section on page 52.
- Try the suggestions in the "Troubleshooting" chapter (page 86).

For information on restoring the unit's default settings on power up, see page 59.

## DXLink Fiber RX – Attaching Signal, Transport, and Control Cables

**Important:** *Before attaching cables, be sure to set the DIP switch's toggles if necessary (see page 40).*

**Warning:** *DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 13).*

*Tips for Fiber Optic Connections:*

- ❑ Keep dust plugs in transceivers until you are ready to make a connection.
- ❑ Clean fiber optic cable ends before attaching to unit (be sure to follow the cable manufacturer's instructions for inspecting and cleaning the cable ends).
- ❑ Use gentle pressure when connecting fiber optic cables to transceivers (normally an audible click is heard when the connector engages).
- ❑ If unsure the connection is properly seated, gently tug on the connector.
- ❑ If fiber optic cables are removed from the transceivers, reinsert dust plugs.
- ❑ Multimode transceivers only – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable **away from you** and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if signal is being passed (works on some digital cameras.)

**Note:** *Power, IR, and RS-232 ports are covered in their own sections.*

### To attach signal, transport, and control cables to the DXLink Fiber RX, Duplex:

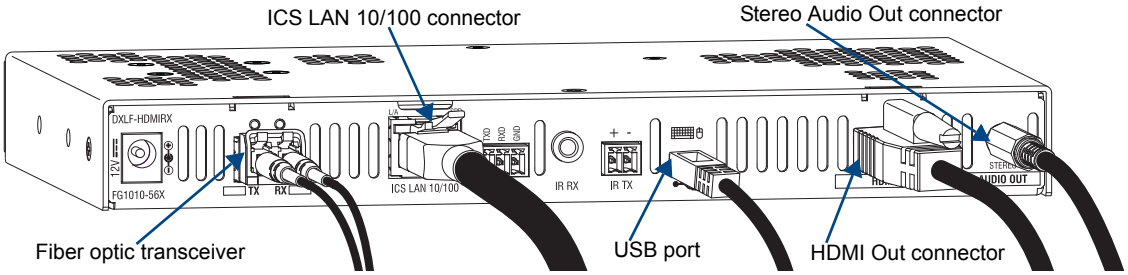



**FIG. 18** Attach signal and control cables to DXLink Fiber RX

1. Clean the end faces on the fiber cable following the manufacturer's recommendations.
2. Fiber optic transceiver – Remove the dust plug (save for further use).
3. Attach a fiber optic cable* to the fiber optic transceiver for transport from the switcher. Always grasp the fiber connector housing to plug (or unplug) a fiber optic cable (depending on the housing, a click may be heard; if not, lightly tug to be sure the connection is tight).
4. HDMI Out connector – Attach the HDMI cable that goes to the destination device.

**Caution:** *When you make the connection in Step 5, be careful not to create a network loop (see page 38).*

5. ICS LAN 10/100 connector (optional) – Attach twisted pair cable from this connector to LAN. Note the #1 Toggle on the DIP switch *must* be set to **ON** to enable this port. (For NetLinx programming information, see page 66.)

**Important:** *The illustration above shows duplex LC fiber cable; when using single LC fiber cables, be sure to verify that the individual wires from the transceiver's TX label on one end of the run are connected to the transceiver's RX label on the other end and vice versa.*

6. USB port (optional) – This port is for sending keyboard / mouse commands to a PC. You can either connect this port to a hub using a USB mini-A cable and then connect keyboard and mouse to the hub or connect directly to a keyboard or mouse using the appropriate mini-A plug adapter cable. The port's default is "enabled." The USB LED on the front monitors this port. For USB support information, see page 23. For USB SEND_COMMAND information, see page 82.
7. Stereo Audio Out connector (optional) – Plug the audio cable (that goes to the audio destination) into the stereo audio jack. For audio precedence information, see page 42. For information on audio SEND_COMMANDs (including enabling the analog audio format), see page 70.

**Note:** *When digital audio and/or analog stereo audio cables are plugged into the TX, the Audio LEDs on the front of both units turn green to show that audio is present and is being incorporated into the HDMI line and is also available on the DXLink Fiber RX at the Stereo Audio Out connector.*

**Note:** *The ID Pushbutton places the DXLink Fiber RX in ID Mode for setting the NetLinx ID (device only) and provides additional functionality, such as placing the device in Static IP Mode or DHCP Mode. For information, see page 57.*

**Tip:** *If scaling adjustments are necessary, use SEND_COMMANDs (see page 66). DGX Configuration Software via the Enova DGX Digital Media Switcher outputs can be used for scaling.*

## DXLink Fiber RX – Applying Power

**Caution:** *The provided desktop power supply must be used to power the DXLink Fiber RX, and it must not be altered in any way.*

### To apply power to the DXLink Fiber RX:

1. Plug the cord from the desktop power supply (provided) into the power jack on rear of the DXLink Fiber RX (2.1 mm DC jack for 12 V local power).
2. Plug the desktop power supply into an AC external power source.
   The Power LED on the front of the DXLink Fiber RX illuminates a constant green, which indicates a ready state. Some LEDs turn a turn a constant color while some blink first. For normal LED display, see the table below.

### DXLink Fiber Receivers, Duplex – Indicator LEDs

The LED indicators are listed in the table as they appear on the front of the RX from left to right.

| DXLink Fiber RX LEDs | Normal Display | Indicates |
|---|---|---|
| Power | Green | Power is applied to the Receiver |
| Video | Green | A video signal is present through the Receiver |
| Audio | Green | An embedded audio signal is present through the Receiver |
| Scaling:<br>– Bypass<br>– Auto<br>– Manual | One LED is green.<br>The other two are off. | Receiver is in one of the three modes for scaling<br>• At power up, the Receiver defaults to Auto Mode, unless a different Scaling Mode has been persisted*<br>• Press the Scaling button to turn on Bypass or Manual |
| IR TX | Red | IR TX active communication |
| IR RX | Yellow | IR RX active communication |
| Serial TX | Red | Serial TX active communication |
| Serial RX | Yellow | Serial RX active communication |
| NetLinx Link/Act | Green | Active LAN connection to an AMX Network |
| NetLinx Status | Green | LAN connection is active |
| CEC | OFF | CEC is not currently supported |
| USB | Yellow | USB port connection is established |

* When the HDMI output cable is disconnected from the DXLink Fiber RX or if no EDID is found on the destination device, the Auto LED is ON. In both cases, the DXLink Fiber RX will revert to a resolution of 1280x1024 @ 60 Hz until a different EDID is detected.

### *DXLink Fiber Receivers, Duplex – LED Troubleshooting*

If the indicator LEDs for the units do not respond with a normal display as stated in the table on the previous page:

- ❑ Check all power connections.
- ❑ Check the "Detailed NetLinx (Link/Act and Status) LED Behavior" section on page 52.
- ❑ Try the suggestions in the "Troubleshooting" chapter (page 86).

For information on restoring the unit's default settings on power up, see page 59.

## Serial Data Transfer and IR Flow Control

The illustration in FIG. 19 shows the bidirectional serial data transfer and IR flow control when DXLink Fiber units are used in Endpoint Mode with an Enova Digital Media Switcher. The switcher has an integrated NetLinx Central Control Processor which provides native AMX control at each remote location fed by a DXLink Fiber Transmitter / Receiver. Control is sent over fiber optic cable (via the fiber optic transceivers).

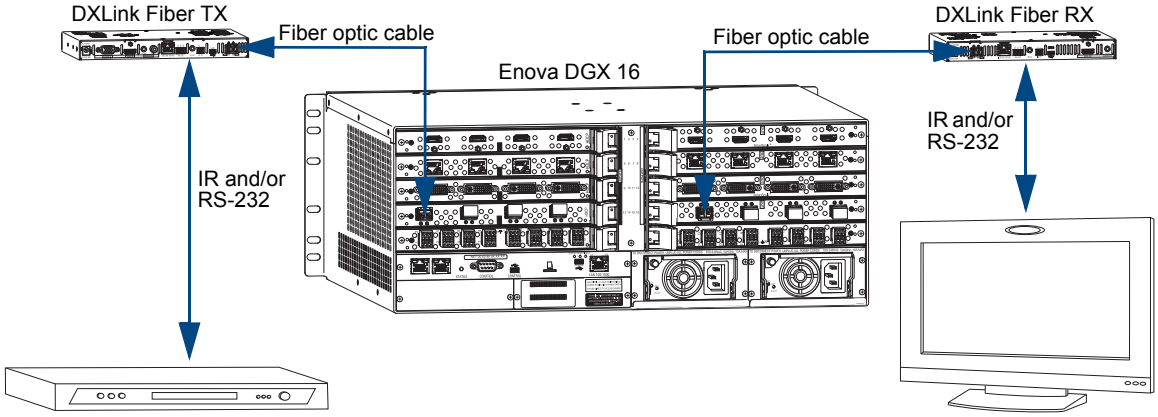



**FIG. 19** Serial data transfer and IR flow control

### Wiring for Serial Data Transfer

The RS-232 (serial) ports are the 3-position screw terminal blocks on the rear of the units to the right of the ICS LAN 10/100 connector. The RS-232 ports can be bound and controlled via the integrated NetLinx Central Controller in the Enova DGX or via another network connected NetLinx Central Controller. For an illustration of serial data transfer, see FIG. 19.

**Note:** *On both DXLink Fiber units, the RS-232 connector pinout is "TX - RX - Ground."*

### To wire the RS-232 (serial) connectors on the RX/TX for data transfer:

1. Wire the RS-232 connectors on the units according to the pinout directly above the connector.

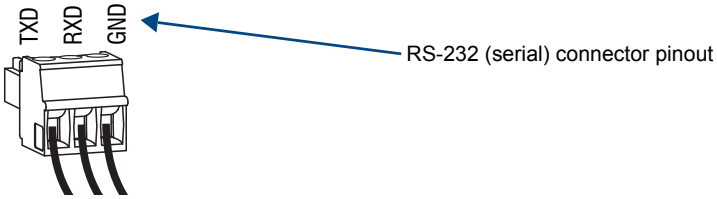



**FIG. 20** Wire RS-232 ports for serial data transfer

2. Use the command RXON to enable this port on the Transmitter and the Receiver. (For complete Serial SEND_COMMAND programming information, see page 80.)

### Serial Control – Endpoint Mode and SEND_COMMANDs

With DXLink Fiber TX/RX Duplex units connected to a switcher (in Endpoint Mode), serial operations are handled by the host providing control of the endpoints. The Master's programming specifies where the serial commands are sent (this is handled independently from the routing of the video signals). For additional information on Endpoint Mode, see page 26. For Serial SEND_COMMANDs, see page 80.

## Optional: DXLink Fiber TX/RX – IR Control

For additional information on the IR03 and CC-NIRC, which are required for IR control, see page 25. (The IR03 and CC-NIRC are not included with the DXLink Fiber units.) The IR ports can be bound and controlled via the integrated NetLinx Central Controller in the Enova DGX or via another network connected NetLinx Central Controller. A compatible remote control unit can also be used with the system.

*IR03 External IR Receiver Module (not included)*

**FIG. 21** IR Receiver cable (FG-IR03)

### To connect an IR Receiver to a TX or to an RX:

1. Connect the jack on the IR03 External IR Receiver Module cable (FG-IR03) to the IR RX port on the unit.
2. Run the cable and attach the IR receiver bud so that it has a clear line-of-sight with the intended remote control device.

*CC-NIRC NetLinx IR Emitter Cable (not included)*

**FIG. 22** IR Emitter cable (FG10-000-11)

### To connect an IR Emitter to a TX or to an RX:

1. Connect the Phoenix connector on the CC-NIRC NetLinx IR Emitter cable (FG10-000-11) to the IR TX port on the unit.
2. Run the other end of the IR Emitter cable to the display device and locate the IR window.
3. Attach the IR Emitter bud over the device's IR sensor by removing the cover on the reverse side of the Emitter and sticking the bud directly over the IR window.

**Important:** *When installation of the IR Receiver and IR Emitter is complete, load the appropriate driver (for instructions, see page 61) and program the IR remote according to the product's documentation.*

### IR Control – Endpoint Mode and SEND_COMMANDs

In Endpoint Mode (TX/RX units are connected to a switcher), IR operations are handled by the host providing control of the endpoints. The Master's programming specifies where the IR commands are sent (this is handled independently from the routing of the video signals). For additional information on Endpoint Mode, see page 35; for specific IR SEND_COMMANDs, see page 76.

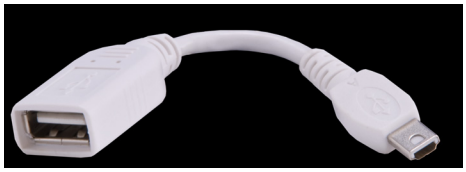
# Optional Accessories for USB Transport

## CC-USB, USB Programming Cable (FG10-5965)

Order this optional programming cable for connecting to a PC (for use with DXLink Fiber Transmitters only).

## CC-MINIUSB, Mini USB to PC Cable Adapter (FG5967-20)

Order this optional cable adapter for connecting a keyboard/mouse device to the DXLink Receiver (for use with DXLink Fiber Receivers only).



# ID Pushbutton Functions

The ID Pushbutton is located on the right front of the DXLink Fiber units.

The ID Pushbutton can be used to perform four types of initial configuration settings:

- Toggle between DHCP and static IP addressing
- Assign a device address
- Reset the factory default settings
- Restore the factory firmware image

The functions performed depend on when and for how long the ID Pushbutton is pressed and held. For complete ID Pushbutton information, see page 57.

**Note:** *ID Pushbutton functions can also be implemented using Telnet commands (see page 93).*

# DXLink Fiber RX Scaling Button and Scaling Modes

The Scaling button is located on the front of the DXLink Fiber Receiver, Duplex. Pressing the Scaling button cycles the RX through the three Scaling Modes: Bypass, Auto, and Manual.

- Bypass Mode – allows the video signal to display over the destination device without altering the signal's resolution.
- Auto Mode (default) – allows the destination device to automatically scale the signal to its preferred or native resolution (this mode is AMX's SmartScale® Technology in action).
- Manual Mode – allows the user to configure the resolution that the video will display through a destination device.

Selecting a Scaling Mode results in the unit maintaining or altering the source device's resolution as it is passed along to the destination device.

The Scaling Mode can be set on the DXLink Fiber RX with the Scaling button (see instructions below), with DGX Configuration Software, or with SEND_COMMANDs (see page 68).

### To set the Scaling Mode:

1. Press the Scaling button on the DXLink Fiber RX once or twice until the LED for the desired Scaling Mode illuminates solid green.

### Bypass Mode

Bypass Mode allows the video signal to display over the destination device without altering the signal's resolution.

**Note:** *Interlaced and progressive video are supported into the Transmitters; the Receiver only supports progressive out unless it is in the Bypass Mode, which is non-scaling.*

### Auto Mode

At power up, the DXLink Fiber RX defaults to Auto Scaling, unless a different Scaling Mode has been persisted. In Auto Mode, the DXLink Fiber RX uses the EDID found on the destination device to automatically determine the best resolution to scale to. If an EDID is not found on the destination device, the DXLink Fiber RX will revert to a default resolution of 1280x1024 @ 60 Hz.

### Manual Mode

Manual Mode allows the user to configure the resolution that the video will display through a destination device. Manual Mode defaults to 1280x1024 @ 60 Hz.

The default resolution can be changed in two ways:

- Use the VIDOUT_RES_REF SEND_COMMAND to set the resolution and refresh rate (for details, see page 68).
- When used as a direct output of an Enova DGX Switcher's DXLink Fiber Output Board, use DGX Configuration Software to set and persist the Manual Scaling resolution for the connector on the DXLink Fiber Output Board; the DXLink Fiber Output Board sends the scaling resolution data to the DXLink Fiber RX.

**Note:** *The aspect ratio conversion policy (see page 70) can also be set on the DXLink Fiber Output Board using DGX Configuration Software. The data is persisted on the board and sent to the DXLink Fiber RX.*

## Persistence of Scaling Mode

The Scaling Mode has two levels of persistence – the basic level happens automatically and can be considered temporary; the advanced level is the result of sending the PERSISTAV command to the DXLink Fiber Output Board and is permanent (unless the Scaling Mode is changed and the PERSISTAV command is sent again).

### *Basic Persistence*

**DXLink Fiber RX** – automatically persists the current Scaling Mode locally. The current state of the scaler is always stored in non-volatile memory on the DXLink Fiber RX.

The current state of the scaler on the DXLink Fiber RX can be changed using one of the following methods:

- By sending the VIDOUT_SCALE SEND_COMMAND (page 68).
- By pressing the Scaling button.

In either case – changes to the Scaling Mode on the RX are also sent to the DXLink Output Board and stored in volatile memory.

**DXLink Fiber Board** – automatically receives the Scaling Mode from an attached RX and stores it in volatile memory. The DXLink Output Board pushes the current Scaling Mode down to the DXLink Fiber RX if any of the following occurs: (1) the RX is power cycled independent of the switcher; (2) the RX is disconnected from the DXLink Output Board and then reconnected; or (3) a different DXLink Fiber RX is connected to the DXLink Output board. The DXLink Output Board's current Scaling Mode then takes precedence and becomes the current Scaling Mode on the DXLink Fiber RX.

### *Advanced Persistence*

A Scaling Mode can be "permanently" persisted to the DXLink Fiber Output Board (in its non-volatile memory) using one of the following methods:

- Using the PERSISTAV SEND_COMMAND (for details, see page 84).
- Using DGX Configuration Software to set and persist the Scaling Mode for the connector on the DXLink Fiber Output Board on the Enova DGX Switcher.

In either case – when the switcher is power cycled, the DXLink Fiber Output Board sends the advanced data for the Scaling Mode (from non-volatile memory) to the DXLink Fiber RX. This will override any locally persisted Scaling Mode on the RX and become the new currently persisted (local) Scaling Mode.

# Detailed NetLinx (Link/Act and Status) LED Behavior

The tables below provide detailed descriptions of all blink patterns for the NetLinx Link/Act and Status LEDs on the front of the Transmitter and Receiver units.

**Note:** *The term "light show" refers to the back-and-forth scanning pattern of the LEDs associated with the LEDs on the DXLink Transmitter and Receiver.*

## DXLink Fiber TX/RX Operational State as Indicated by LEDs

To determine the operational state (normal boot) of a DXLink Fiber Transmitter or Receiver by its LEDs, check both the Link/Act and Status LED columns.

| NetLinx LED Behavior and Operational State | | |
|---|---|---|
| **Link/Act LED** | **Status LED** | **DXLink Fiber TX/RX Operational State** |
| ON when connected to the switcher (which contains an integrated Master).<br>Blink OFF with data. | Follow Master's instruction for Blink Message if online with Master, otherwise ON. | Normal Online with Master (rest) |
| OFF | ON | Normal Boot (DHCP found)<br>**Note:** *This state continues from the time an IP address is obtained until the device is online with the Master.* |
| Fast blink, then normal operation. | ON | Normal Boot (DHCP, no server)<br>**Note:** *This state continues until a valid IP address is obtained.* |
| OFF during light show, then normal operation (OFF until connected to Master). | Fast blink (continues only during light show), then ON until first blink from Master. | Normal Boot (Static IP)<br>**Note:** *This state continues until the device finishes its light show.* |

## ID Pushbutton Boot State and LED Behavior

To monitor the ID Pushbutton boot state of a DXLink Fiber Transmitter or Receiver by its LEDs, check both the Link/Act and Status LED columns.

| ID Pushbutton Boot and NetLinx LED Behavior | | |
|---|---|---|
| **ID Pushbutton Boot States** | **Link/Act LED** | **Status LED** |
| Boot with ID Pushbutton held down. | Slow blink (1 Hz) | Slow blink (1 Hz) |
| ID Pushbutton held down long enough for reset to default parameters. | Fast blink until ID Pushbutton is released, then OFF | Fast blink until ID Pushbutton is released, then OFF |
| ID Pushbutton held down long enough for reset to default firmware image. | Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot. | Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot. |
| In Auto ID mode. | Normal | Blink (2 Hz) |
| ID Pushbutton held down long enough to accept new ID. | 2 blinks, then normal | 2 blinks, then normal |
| After boot: ID Pushbutton held down, but not long enough for IP mode change. | Slow blink (1 Hz) | Slow blink (1 Hz) |
| After boot: ID Pushbutton held down long enough for IP mode change. | Fast blink, then OFF | Fast blink, then OFF |

### Downloading Firmware State and LED Behavior

To monitor the state of a TX or an RX by its LEDs when downloading firmware, check both the Link/Act and Status LED columns.

| NetLinx LED Behavior when Downloading Firmware | | |
|---|---|---|
| **Downloading Firmware** | **Link/Act LED** | **Status LED** |
| Downloading firmware to flash due to an upgrade via NetLinx Studio. | Fast blink, alternating with Status LED | Fast blink, alternating with Link/Act LED |

## DXLink Fiber TX – Local Out (HDMI) Port

The Local Out port on the right front of the DXLink Fiber Transmitters can be used to send the source signal to a local monitor.

## DXLink Fiber TX/RX in a Multiple-Stage Switching System

When switching systems with DXLink Fiber Technology support (e.g., an Enova DGX 16 Digital Media Switcher) are connected via their fiber optic transceivers, DXLink Fiber Transmitters and Receivers can be used to extend the video and audio transport.

**Important:** *This section does not refer to the linking of enclosures using the RJ-45 ports on the left of the CPU boards (the Enova DGX Digital Media Switcher does not support CPU to CPU linking).*

In an installation with DXLink Fiber equipment in a multiple-stage switching system, the following apply:

- When two switching systems with DXLink Fiber support are connected via their fiber optic transceivers, only video and audio will be passed through the fiber connection.
- When a fiber optic transceiver on one switching system determines that it is connected to a fiber optic transceiver on another switching system, the transceiver will automatically disable all Ethernet, power, and control on that connection port so that the only things passed down the fiber optic cable are the video and audio signals.
- When connecting switching systems via fiber optic transceivers, AMX recommends no more than three switcher throughputs (see the "Example" on the next page).

#### *Example*

This example shows how DXLink Fiber Transmitters and Receivers can be used in a system where switchers are connected via their fiber optic transceivers.

The signal path through three switchers could be:

Source device sends signal → **DXLink Fiber Transmitter** → Enova DGX 8, DXLink Fiber Input Board (out a DXLink Fiber Output Board) → Enova DGX 16, DXLink Fiber Input Board (out a DXLink Fiber Output Board) → Enova DGX 32, DXLink Fiber Input Board (out a DXLink Fiber Output Board) → **DXLink Fiber Receiver** → display device outputs an HDMI signal.

# Network Configuration

## Overview

DXLink Fiber Transmitters and Receivers support two IP Addressing Modes: Static IP and DHCP (with link-local fallback*).

To avoid having a large system consume numerous IP addresses, the Transmitters and Receivers default to disabling the network connection functionality. Therefore, the #3 Toggle *must* be set to ON before the Transmitters or Receivers can establish a network connection (see page 39).

When #3 Toggle is ON, the DXLink Fiber units are automatically placed in DHCP Mode, but they can be configured for either of the IP Addressing Modes via two methods:

- The front-panel ID Pushbutton (page 57)
- Telnet commands (page 93)

* "Link-local fallback" is a method by which an IP host, as a fallback from DHCP, can derive a local network-unique IP address by negotiating with the other IP hosts on the same network. Link-local can also be used in its own right as the primary method of IP address allocation. For details, see "DHCP Mode" below.

### Static IP Mode – Default Parameters

| Default Parameters For Static IP Mode | |
|---|---|
| Address | 192.168.1.2 |
| Netmask | 255.255.255.0 |
| Gateway | 192.168.1.1 |
| DNS1 | 192.168.1.1 |
| DNS2 | 192.168.1.1 |
| DNS3 | 192.168.1.1 |

### DHCP Mode

DHCP Mode requires a connection (indirect) to a network with a DHCP server located on it. The Enova DGX Digital Media Switcher (Endpoint Mode) can be connected to a DHCP server device; the DHCP connection is then propagated through the system's DXLink Fiber layer to the DXLink Fiber unit.

**Important:** *DHCP Mode will not function until the #3 Toggle on the DIP switch is set to ON (see page 39). The #3 Toggle must be ON before the device is accessible via SEND_COMMANDs.*

When in DHCP Mode (the default setting), the DXLink Fiber unit will attempt to get a DHCP lease (consisting of an IP address, gateway, and other network parameters). Should the attempt fail, the unit will then configure itself for a link-local address.

- DXLink Fiber units utilize a modified link-local addressing procedure. The first address to be tried is a known address in the link-local space: 169.254.2.2. That address will be probed, and if unclaimed will be used by the DXLink Fiber unit.
- If 169.254.2.2 is already claimed, the DXLink Fiber unit will choose a random address within the 169.254.x.x link-local address space (again probing to ensure that it is unclaimed).

Once the unit is operating with a link-local address, it will periodically re-try DHCP and re-assign the IP address to a valid DHCP grant if successful.

At any time, if the unit determines that its IP address has changed, it will disconnect from the Master (if necessary, depending on the connection state) and then reconnect to the Master.

## TCP/IP Address Configuration

DXLink Fiber Transmitters and Receivers support IPV4 network addresses, gateway addresses, DNS server addresses, and network names. They also support NDP (NetLinx Discovery Protocol) capabilities as well as IP discovery via NetLinx Studio.

**Note:** *NDP is a device discovery method used by NetLinx Masters. With NDP Beacon enabled, the Master will transmit NDP Beacons for AMX's proprietary device discovery.*

## Telnet IP Configuration Commands

The `SET IP` and `GET IP` Telnet commands listed in the tables in Appendix B (which start on page 93) can be sent directly to the DXLink Fiber units via a Telnet terminal session. These commands can be used for initial network configuration of the units.

- The default Telnet port is 23.
- Telnet is enabled by default.
- A value of 0 disables the telnet server.*

For details, see "Appendix B – Telnet (Terminal) Commands" on page 93. The appendix also includes a section on "Master Connection Modes" on page 108.

* If you set the Telnet port to "0" to disable it, you will need to perform a factory reset using the ID Pushbutton to re-enable it (see page 59).

## Factory Default Parameters

| Factory Default Parameters | |
|---|---|
| **Parameter** | **Value** |
| MAC Address | As set in factory |
| Serial Number | As set in factory |
| Ethernet Mode | Auto (i.e., speed, duplex, both, auto) |
| IP Addressing Mode | DHCP |
| IP Address (for static mode) | 192.168.1.2 |
| Netmask (for static mode) | 255.255.255.0 |
| Gateway (for static mode) | 192.168.1.1 |
| DNS1 (for static mode) | 192.168.1.1 |
| DNS2 (for static mode) | 192.168.1.1 |
| DNS3 (for static mode) | 192.168.1.1 |
| DNS Domain | amx.com |
| Hostname | Last 7 digits of the serial number |
| Master Connection Mode | NDP - for details, see page 108 |
| Master URL (for TCP and UDP URL modes) | “” (blank) |
| Master Connection Port Number (for TCP and UDP URL modes) | 1319 |
| Friendly-Name | “” (blank)<br>**Note:** *If the Friendly Name is non-blank, both Friendly Name and Location are concatenated to make NDPSTRING2, otherwise NDPSTRING2 is generated from the unit’s serial number.* |
| Location | “” (blank) |
| Stored MAC Address of Master (used for NDP binding) | 00:00:00:00:00:00 |
| ICSP Device Number | 0 (0 = receive dynamic device number from Master) |
| System Number | 0 |
| Telnet Port | 23 (A value of 0 disables the Telnet server. Telnet is enabled by default.) |
| SET BAUD | 9600, N, 8, 1 |
| CTOF Time | 5 (0.5 seconds) |
| CTON Time | 5 (0.5 seconds) |
| **Receivers Only** | |
| VIDOUT_ASPECT_RATIO | STRETCH |
| VIDOUT_RES_REF | 1280x1024,60 (for Manual Mode) |
| AUDOUT_FORMAT | All |
| **Transmitters Only** | |
| VIDIN_AUTO_SELECT | ENABLE (Digital) |
| VIDIN_FORMAT | VGA (on Port 8) |
| VIDIN_RES_AUTO | ENABLE |
| VIDIN_PREF_EDID | 1920x1080p,60 (EDID default) |
| VIDIN_EDID | ALL RESOLUTIONS (on both Ports 7 and 8) |
| VIDIN_HDCP | ENABLE |
| VIDIN_VSHIFT | 0 |
| VIDIN_HSHIFT | 0 |
| VIDIN_PHASE | 0 |
| AUDIN_FORMAT_AUTO | ENABLE |
| AUDIN_FORMAT | HDMI |

## Device IDs

| Device IDs | |
|---|---|
| **Model** | **ID (16-bits) Bound*** |
| DXLF-MFTX-SM-D | 0x0195 |
| DXLF-HDMIRX-SM-D | 0x0194 |
| DXLF-MFTX-MM-D | 0x0195 |
| DXLF-HDMIRX-MM-D | 0x0194 |

* The Device ID for unbound units defaults to 0x014B until the unit is bound and the system is refreshed in NetLinx Studio.

## Using the ID Pushbutton

The ID Pushbutton is located on the right front of the DXLink Fiber TX/RX units.

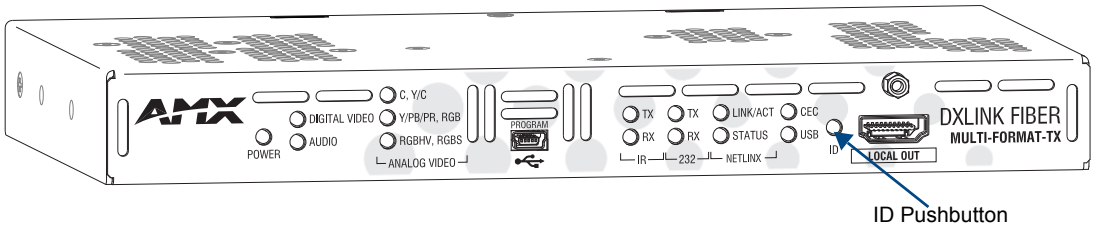



**FIG. 23** ID Pushbutton on a DXLink Fiber TX

The ID Pushbutton can be used to perform four types of initial configuration settings:

- Toggle between DHCP and static IP addressing (below)
- Assign a device address (page 58)
- Reset the unit to its factory default settings, which affects the parameters but not the firmware version (page 59)
- Restore the unit to its factory firmware image, which affects both the firmware version and the parameters (page 59)

The functions performed depend on when and for how long the ID Pushbutton is pressed and held. ID Pushbutton functions can also be implemented using Telnet commands (see page 93).

**Tip:** *To monitor the ID Pushbutton boot state of a unit by its NetLinx LED behavior, see page 60.*

### Toggling Between IP Addressing Modes: DHCP and Static IP

DXLink Fiber Transmitters and Receivers, Duplex support both DHCP and static IP addresses. When the #3 Toggle is ON (see page 39), the units automatically use DHCP with link-local fallback. However, you can use a static IP address which has been set via a Telnet command (`SET IP`), or you can use the factory default static IP address. The default static IP address can be recalled at any time by resetting the unit to its factory default configuration (see page 59). The default dynamic (DHCP) address is 169.254.2.2.

The ID Pushbutton can be used to toggle between the DHCP and Static IP Modes.

### To toggle between DHCP and Static IP Modes:

1. **Once the TX/RX unit has booted up,** press and hold the ID Pushbutton until the Control/NetLinx LEDs toggle back and forth in unison approximately 10 times.
2. Release when the LED starts to blink faster.
   - When the ID Pushbutton is released, the unit toggles either from static to dynamic (DHCP) IP addressing or vice versa and remains in that mode until the ID Pushbutton is used to set it again or a factory reset is performed.
   - The DXLink Fiber unit automatically reboots to complete the process.

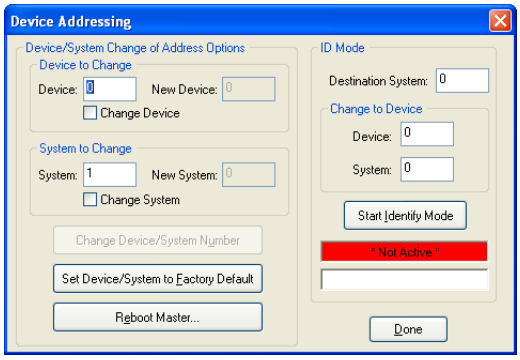
## Assign a Device Address (ID Mode)

The ID Pushbutton can be used in conjunction with the ID (Identify) Mode feature in NetLinx Studio. A momentary press of the ID Pushbutton assigns a device address to the Transmitter or Receiver (which must be bound to the Master). The device *must* first be placed in ID Mode in NetLinx Studio or the momentary press will be ignored.

**Note:** *The latest version of NetLinx Studio is available to download and install from www.amx.com. Refer to the NetLinx Studio Online Help for instructions on using the application.*

### To set the device address on a Transmitter or Receiver:

1. Check to be sure #3 Toggle on the bottom of the Transmitter or Receiver is set to ON.
2. In NetLinx Studio's OnLine Tree, select the Master to which the unit is bound.
3. From the Diagnostic menu, select Device Addressing.
   The Device Addressing dialog box opens.




4. In the ID Mode section, enter the Device and System numbers that you want assigned to the device in the appropriate text boxes.
5. Click Start Identify Mode to place the named system in ID Mode.
   The button changes to "Cancel Identify Mode" (click to cancel ID Mode).
   The text box below the button displays a "Waiting...Press Cancel to Quit" message.

**Note:** *When in ID Mode, the entire system is put on hold while it waits for an event from any NetLinx device in the named system (e.g., pressing the ID Pushbutton on the Receiver). The device that generates the first event is the device that will be "identified."*

6. Briefly press and release the ID Pushbutton on the Transmitter or Receiver.
   The unit will exhibit the following behavior:
   - Respond with an ID Mode address response.
   - Report its old address offline.
   - Report its new address online.

The OnLine Tree will refresh to display the new device address for the Transmitter or Receiver.

**Note:** *NetLinx Studio (v3.3 or higher) provides the ability to auto-increment IP Addresses and Hostnames as well as Device and System Numbers. Refer to the NetLinx Studio Online Help for details.*

**Tip:** *In the following two procedures – if you start a press and hold sequence with the ID Pushbutton and then decide not to change the settings, before you release the ID Pushbutton remove power from the unit to abort the procedure.*

### Reset the Factory Default Settings

*During power up* – if the ID Pushbutton is held until the Control/NetLinx LEDs toggle back and forth in unison approximately 10 times, then released when the faster blinking starts, the Transmitter or Receiver will reset to its factory default settings, which affect the parameters but not the firmware version.

#### *Factory Parameters**

- Default static IP address of 192.168.1.2
- Default dynamic (DHCP) address of 169.254.2.2
- Default device number of 0
- NDP mode (page 108)
- Unbound state
- No IRL files

* For a complete list of factory parameters, see the table on page 56.

### To reset a Transmitter or Receiver to its factory default settings:

1. Press and hold the ID Pushbutton **while plugging in the power connector**. Start counting when the NetLinx LEDs begin to flash in unison, *not* when the power connector is inserted.
   - Once the Transmitter or Receiver has started booting up, both NetLinx LEDs flash in unison at the rate of once per second.
   - After 10 flashes at that rate, the LEDs will blink in unison at a faster rate.

**Note:** *A press-and-hold of the ID Pushbutton at power up will prevent the Transmitter or Receiver from attempting to come online until the ID Pushbutton is released. The Transmitter or Receiver will only attempt to come online if you release the ID Pushbutton prior to the faster blink rate.*

2. At the point that the blink rate increases, release the ID Pushbutton.
3. The Transmitter or Receiver will automatically reboot to complete the process.

### Restore the Factory Firmware Image and Factory Default Parameters

*During power up* – if the ID Pushbutton is held until the Control/NetLinx LEDs toggle back and forth in unison approximately 30 times (10 slow, 20 fast) and then released when they go solid, the unit's factory firmware image will be restored. This procedure affects both the firmware version and the parameters.

### To restore the Transmitter or Receiver to its factory default firmware image:

1. Press and hold the ID Pushbutton while plugging in the power connector. Start counting when the NetLinx LEDs begin to flash in unison, *not* when the power connector is inserted.
2. After the LEDs complete the following sequence, *release the ID Pushbutton*:
   - Once the Transmitter or Receiver has started booting up, all LEDs flash in unison at the rate of once per second.
   - After 10 flashes at that rate, the LEDs will blink in unison at a faster rate.
   - After 10 seconds of flashing at the increased rate, all LEDs go to solid ON.
3. Upon release of the ID Pushbutton, the Transmitter or Receiver executes the following actions:
   a. Restores itself to its factory firmware image.
   b. Resets to factory default parameters.*
      - Deletes the IRL files stored on the device.
      - Resets to the default static IP address of 192.168.1.2 and default DHCP address of 169.254.2.2.
      - Resets to the default device number of 0 (when bound to a Master, it will receive a dynamic device number from the Master).
      - Resets to NDP mode and being unbound.

* For a complete list of factory parameters, see the table on page 56.

4. Once all actions in Step 3 are completed, the LEDs all turn off, indicating the Transmitter or Receiver is ready to reboot. The Transmitter or Receiver automatically reboots to complete the process.

**Tip:** *To monitor the ID Pushbutton boot state of a unit, see the "ID Pushbutton Boot and NetLinx LED Behavior" table below.*

## ID Pushbutton Boot State and LED Behavior

To monitor the ID Pushbutton boot state of a DXLink Fiber TX/RX by its LEDs, check both the Link/Act and Status LED columns.

**ID Pushbutton Boot and NetLinx LED Behavior**

| ID Pushbutton Boot States | Link/Act LED | Status LED |
|---|---|---|
| Boot with ID Pushbutton held down | Slow blink (1 Hz) | Slow blink (1 Hz) |
| ID Pushbutton held down long enough for reset to default parameters | Fast blink until ID Pushbutton is released, then OFF | Fast blink until ID Pushbutton is released, then OFF |
| ID Pushbutton held down long enough for reset to default firmware image | Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot | Solid ON, transitions to OFF once the unit completes writing to flash and is ready to reboot |
| In Auto ID mode | Normal | Blink (2 Hz) |
| ID Pushbutton held down long enough to accept new ID | 2 blinks, then normal | 2 blinks, then normal |
| After boot: ID Pushbutton held down, but not long enough for IP mode change | Slow blink (1 Hz) | Slow blink (1 Hz) |
| After boot: ID Pushbutton held down long enough for IP mode change | Fast blink, then OFF | Fast blink, then OFF |

# IRL File Transfers

## Overview

The NetLinx Studio software application (available for free download from www.amx.com) provides the ability to transfer IR Library files to NetLinx devices such as DXLink Fiber Transmitters and Receivers.

### Endpoint System (with a Switcher)

When a Transmitter and/or a Receiver are being used in conjunction with a switcher as an endpoint system, the switcher's integrated Master is used for the IRL file transfer. FIG. 24 shows a Transmitter and a Receiver bound to the integrated Master in an Enova DGX 32 in NetLinx Studio's OnLine Tree. Follow the instructions on the top of page 62 to prepare an endpoint system for IRL file transfer and the instructions on page 63 for the actual transfer.

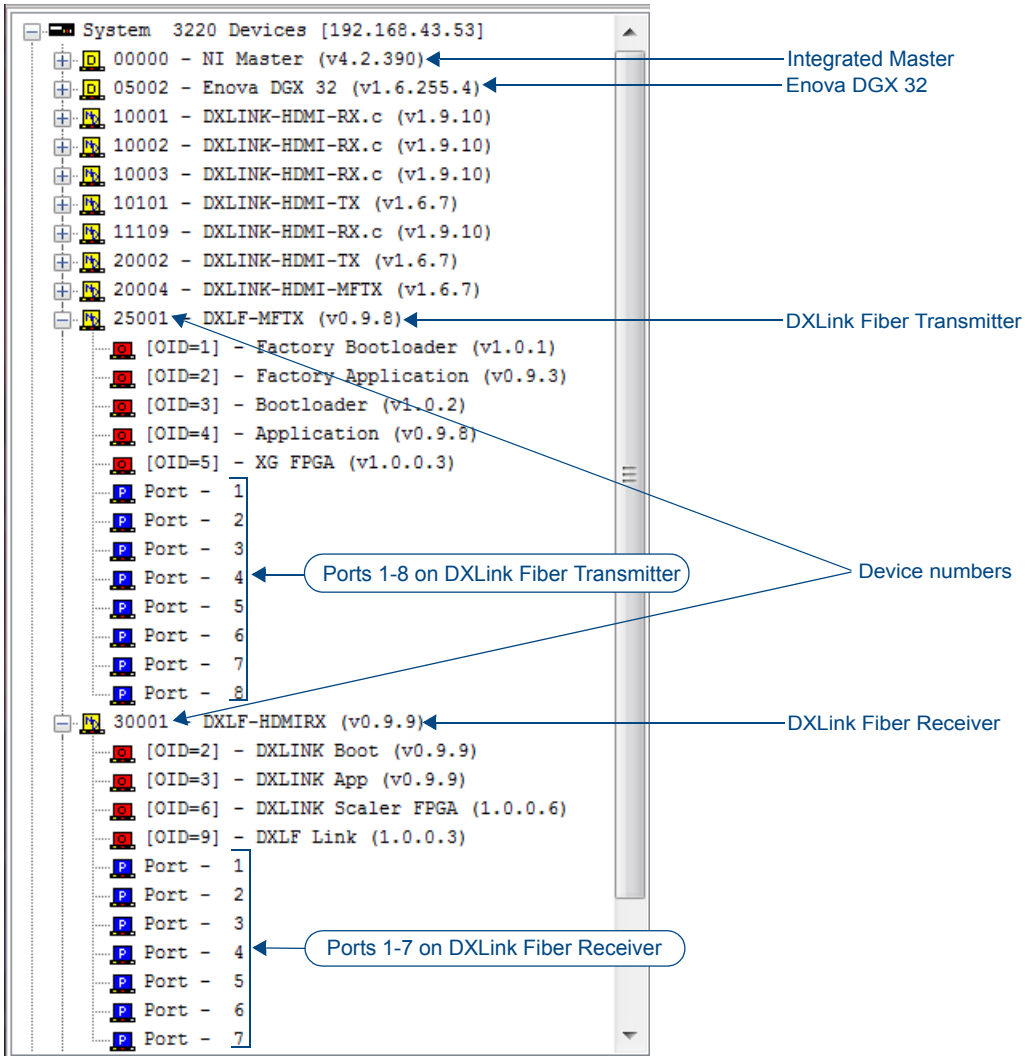


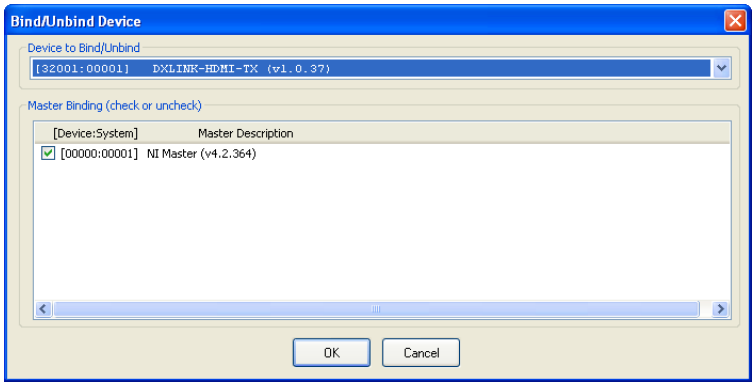

**FIG. 24** NetLinx Studio – Integrated Master, Enova DGX 32, DXLink Fiber Transmitter and Receiver

# Preparing for IRL File Transfers in an Endpoint System

## To prepare for IRL file transfers in an endpoint system:

1. Check to be sure #3 Toggle on the bottom of the Transmitter or Receive is set to ON.
2. Verify that you have the latest version of NetLinx Studio on your PC.
   *If the version is not the latest –*
   - Use the Web Update option in NetLinx Studio's Help menu to obtain the latest version.

   **Or**
   - Go to www.amx.com and login as a Dealer to download the latest version.
3. Download the applicable IRL file from www.amx.com (Partners / Search Devices) to your PC.
4. Verify the following:
   a. Verify that an Ethernet/RJ-45 cable is connected from the switcher's integrated Master to the network (e.g., from the LAN 100/1000 port on an Enova DGX 32 to a LAN).
   b. Verify that the target Transmitter or Receiver is connected via its fiber optic connection to a DXLink Fiber Input or Output Board (respectively) on the switcher.
   c. Verify that the switcher is powered on.
5. Launch NetLinx Studio and open the OnLine Tree.
6. Bind the target Transmitter or Receiver to the integrated Master:
   a. Select and right-click the TX or RX in the Online Tree.
   b. From the context sensitive menu, select Network Bind/Unbind Device.
   c. Verify that the check box is selected. If not selected, select it now.
   d. Click OK.



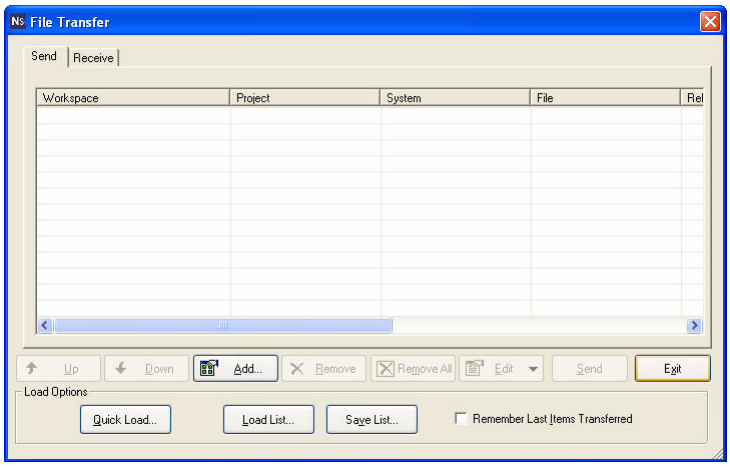

7. Determine the Device Number assigned to the target Transmitter or Receiver when it was bound. For the Device Number location, see FIG. 24 on the previous page.
   The Transmitter or Receiver is ready for the IRL file transfer (see page 63).

# Transferring IRL Files

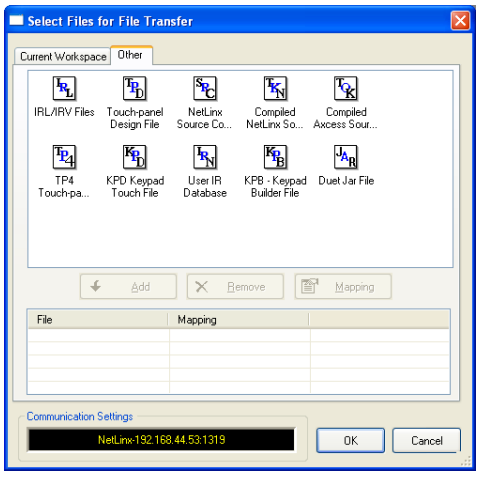
The *File Transfer* tool in NetLinx Studio is used to map IRL files to DXLink Fiber Transmitters and Receivers. The instructions below assume that the preparations on the previous page for IRL file transfers for an endpoint system have been completed.

## To send an IR Library (*.IRL) file to a Transmitter or Receiver:

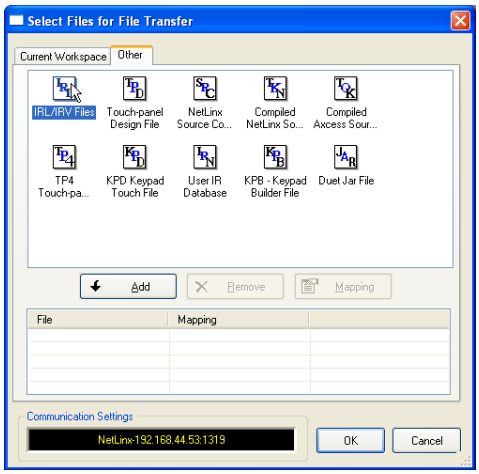
1. In NetLinx Studio, select Tools > File Transfer to open the File Transfer dialog box.



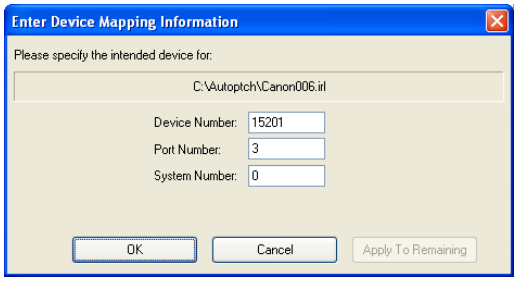

2. Click Add to open the Select Files for File Transfer dialog box.
3. Open the Other tab (if the file you want to transfer is not included in the open workspace.)
   The Other tab consists of a display of the different types of files that can be transferred to the Master or System devices on the bus.



4. Select the type of file (in this case, IRL/IRV Files) that you want to add to the File list for transfer.



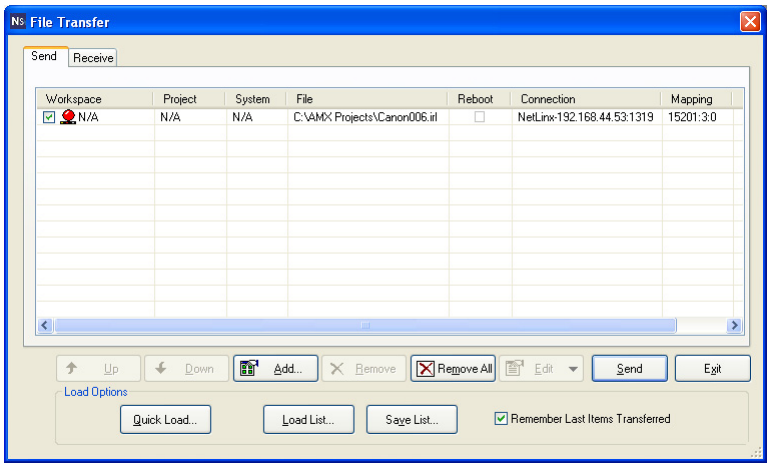

5. Click Add.
   A standard Open dialog box opens with the Files of type selection set to IR Code files (*.IRL/*.IRV).
6. Locate and select the IRL file that you want to add.
7. Click Open.
   The Enter Device Mapping Information dialog box opens.




**Note:** *IRL files must be sent to Port 3 (IR Device Port) on the Transmitter or Receiver.*

8. If the fields are empty – Enter the Device, Port, and System numbers for the selected device.
   If the fields are populated – Verify that the mapping information is correct for the selected device.
   - IRL files are sent to Port 3 (IR Device Port) on the Transmitter or Receiver.
   - Refer to the "Device Numbering" section on page 66 for information on device numbering for the Transmitter or Receiver.
   - If the device's assigned device number has been changed, use the OnLine Tree to determine it.
9. Click OK to return to the Select Files for File Transfer dialog box.
   The selected IRL file and its mapping information are indicated in the File and Mapping lists.

**10.** Click OK to close the Select Files for File Transfer dialog box and return to the File Transfer dialog box. The IRL file appears in the File queue.




**11.** Click Send to transfer the file to the Transmitter or Receiver that the file is mapped to.

## Additional Documentation

For additional information on using NetLinx Studio, refer to the *Instruction Manual – NetLinx Studio v3.3* and the *WebConsole & Programming Guide – NetLinx Integrated Controllers* (available at www.amx.com).

## Additional IRL Information

Unlike NetLinx NI-Controllers, ICSLan powered devices (such as the DXLink Fiber Transmitter and Receiver units) are *not* capable of having their IRL files received via the File Transfer dialog box, nor do they support the LOADIRL SEND_COMMAND.

# NetLinx Programming – DXLink Fiber TXs/RXs

## Overview

**Important:** *Before DXLink Fiber TXs and RXs can receive any NetLinx SEND_COMMANDs, the DIP switch's #3 Toggle must be set to ON or the devices will not be accessible from a NetLinx control system.*

The DXLink Fiber Transmitters and Receivers recognize a select number of SEND_COMMANDs and CHANNELs.


- Receiver Video SEND_COMMANDs – page 68
- Receiver Audio SEND_COMMANDs – page 70
- Transmitter Video SEND_COMMANDs – page 71
- Transmitter Audio SEND_COMMANDs – page 75
- IR SEND_COMMANDs and CHANNELs – page 76
- SERIAL SEND_COMMANDs – page 80
- Transmitter USB SEND_COMMANDs – page 82
- Receiver USB SEND_COMMANDs – page 82
- Common DXLink Fiber Transmitter / Receiver SEND_COMMANDs – page 83
- DXLink Fiber System SEND_COMMANDs – page 84
- SEND_STRING Escape Sequences – page 85


**Note:** *For a list of all supported Telnet commands, see page 95.*

## Device Numbering and Ports

Each DXLink Fiber unit has its own Device Number (which is assigned when the unit is bound to a Master) and the following ports.

### Transmitters and Receivers

Port 1 – Serial
Port 2 – Not used
Port 3 – IR TX
Port 4 – IR RX
Port 5 – USB
Port 6 – Digital Video/Audio Output
Port 7 – Digital Video/Audio Input
Port 8 – Analog Video Input (Transmitters only)

For an example of port numbering, see the NetLinx Studio illustration in FIG. 25 on the next page.

In NetLinx Studio's OnLine Tree, the DXLink Fiber Transmitters and Receivers each display their ports.

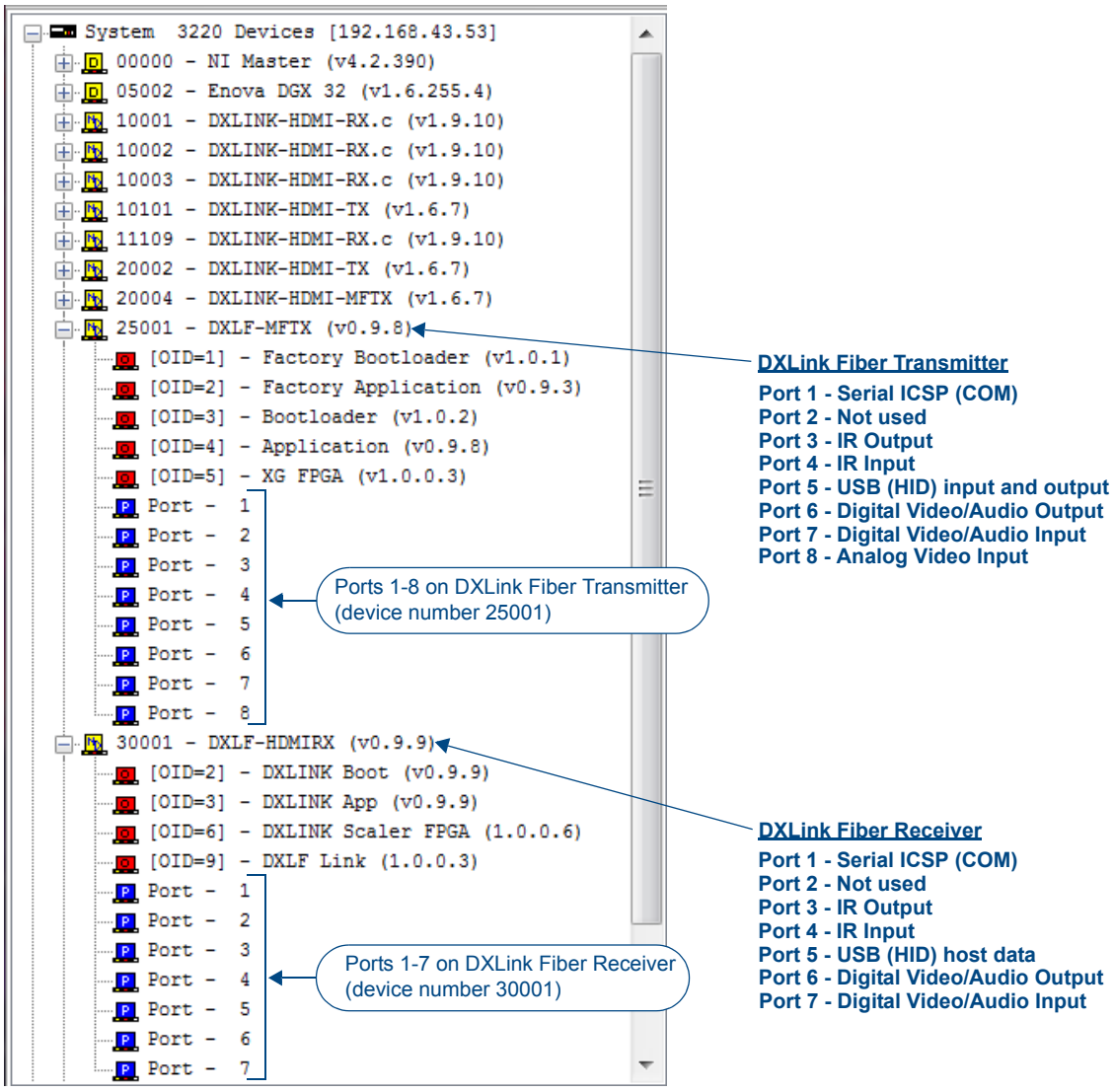

System 3220 Devices [192.168.43.53]
00000 - NI Master (v4.2.390)
05002 - Enova DGX 32 (v1.6.255.4)
10001 - DXLINK-HDMI-RX.c (v1.9.10)
10002 - DXLINK-HDMI-RX.c (v1.9.10)
10003 - DXLINK-HDMI-RX.c (v1.9.10)
10101 - DXLINK-HDMI-TX (v1.6.7)
11109 - DXLINK-HDMI-RX.c (v1.9.10)
20002 - DXLINK-HDMI-TX (v1.6.7)
20004 - DXLINK-HDMI-MFTX (v1.6.7)
25001 - DXLF-MFTX (v0.9.8)
[OID=1] - Factory Bootloader (v1.0.1)
[OID=2] - Factory Application (v0.9.3)
[OID=3] - Bootloader (v1.0.2)
[OID=4] - Application (v0.9.8)
[OID=5] - XG FPGA (v1.0.0.3)
Port - 1
Port - 2
Port - 3
Port - 4
Port - 5
Port - 6
Port - 7
Port - 8
30001 - DXLF-HDMIRX (v0.9.9)
[OID=2] - DXLINK Boot (v0.9.9)
[OID=3] - DXLINK App (v0.9.9)
[OID=6] - DXLINK Scaler FPGA (1.0.0.6)
[OID=9] - DXLF Link (1.0.0.3)
Port - 1
Port - 2
Port - 3
Port - 4
Port - 5
Port - 6
Port - 7
Ports 1-8 on DXLink Fiber Transmitter (device number 25001)
Ports 1-7 on DXLink Fiber Receiver (device number 30001)
DXLink Fiber Transmitter
Port 1 - Serial ICSP (COM)
Port 2 - Not used
Port 3 - IR Output
Port 4 - IR Input
Port 5 - USB (HID) input and output
Port 6 - Digital Video/Audio Output
Port 7 - Digital Video/Audio Input
Port 8 - Analog Video Input
DXLink Fiber Receiver
Port 1 - Serial ICSP (COM)
Port 2 - Not used
Port 3 - IR Output
Port 4 - IR Input
Port 5 - USB (HID) host data
Port 6 - Digital Video/Audio Output
Port 7 - Digital Video/Audio Input

**FIG. 25** NetLinx Studio OnLine Tree - Ports 1-8 on DXLink Fiber Transmitter and Ports 1-7 on Receiver

**Note:** *For additional information on using NetLinx Studio, refer to the "Instruction Manual – NetLinx Studio v3.3" and the "WebConsole & Programming Guide – NetLinx Integrated Controllers" (available at www.amx.com).*

**Note:** *All command text is based on a Unicode index.*

**Tip:** *Occasionally new firmware versions affect SEND_COMMANDs. If a command does not produce the expected results, we suggest checking the product's current firmware version against the information in the "Firmware Version" table on page 92.*

## CHANNELs

| Channel | Function |
|---|---|
| 255 | This channel *On* indicates that the DXLink Fiber unit has a valid UTP (twisted pair cable) connection to a switcher with an integrated Master.<br>If the channel is *Off*, the DXLink Fiber unit is incorrectly connected.<br>1-253 Key presses from selected remote control. |

**Important:** *Before DXLink Fiber Transmitters and Receivers can receive any NetLinx SEND_COMMANDs, the DIP switch's #3 Toggle must be set to ON or the devices will not be accessible from a NetLinx control system.*

**Note:** *Since not all devices support both upper and lower case, for best results all commands and parameters should be sent in upper case.*

## DXLink Fiber Receiver Video SEND_COMMANDs

DXLink Fiber Receiver Video SEND_COMMANDs are sent to Port 6.

**Note:** *Asynchronous notifications are not available for the Receivers via NetLinx Studio (and Telnet).*

| Video SEND_COMMANDs (Receivers) | |
|---|---|
| **Command** | **Description** |
| **?VIDOUT_SCALE**<br>Requests the current Scaling Mode that the Receiver is set to. The modes are AUTO (SmartScale®), MANUAL, and BYPASS. | Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDOUT_SCALE'"`<br>Example:<br>`SEND_COMMAND dvRX,"'?VIDOUT_SCALE'"`<br>Returns a COMMAND of the form:<br>`VIDOUT_SCALE-<AUTO/MANUAL/BYPASS>` |
| **VIDOUT_SCALE**<br>Sets the Scaling Mode on the Receiver to AUTO (SmartScale®), MANUAL, or BYPASS. | Syntax:<br>`SEND_COMMAND <DEV>,"'VIDOUT_SCALE-<scaling mode>'"`<br>Valid responses:<br>scaling mode = AUTO, MANUAL, BYPASS<br>Example:<br>`SEND_COMMAND dvRX,"'VIDOUT_SCALE-MANUAL'"` |
| **?VIDOUT_RES_REF**<br>Requests the resolution and refresh rate of the video through the Receiver.<br>**Note:** If the Scaling Mode is set to Bypass, the response will be "BYPASS." | Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDOUT_RES_REF'"`<br>Valid responses:<br>• horizontal = An integer value representing the horizontal.<br>• vertical = An integer value representing the vertical. May have an additional qualifier such as "p" or "i".<br>• rate = An integer value representing the refresh rate.<br>Example:<br>`SEND_COMMAND dvRX,"'?VIDOUT_RES_REF'"`<br>Returns a COMMAND of the form:<br>`VIDOUT_RES_REF-<horizontal>x<vertical>,<rate>` |
| **VIDOUT_RES_REF**<br>Sets the resolution and refresh rate of the video through the Receiver.<br>**Important:** *The "valid responses" values used must come from the Resolution Names listed in the table in the "Supported Output Resolutions" appendix on page 122.*<br>**Note:** *The default for Manual Mode is 1280x1024,60.* | Syntax:<br>`SEND_COMMAND <DEV>,"'VIDOUT_RES_REF-<horizontal>x<vertical>,<rate>'"`<br>Valid responses:<br>• horizontal = An integer value representing the horizontal.<br>• vertical = An integer value representing the vertical. May have an additional qualifier such as "p" or "i".<br>• rate = An integer value representing the refresh rate.<br>Example:<br>`SEND_COMMAND dvRX,"'VIDOUT_RES_REF-1920x1080p,60'"` |

| Video SEND_COMMANDs (Receivers), continued | |
|---|---|
| **?VIDOUT_RES**<br>Requests the resolution and refresh rate of the video through the Receiver.<br>**Note:** If the Scaling Mode is set to Bypass, the response will be "BYPASS." | Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDOUT_RES'"`<br>Valid responses:<br>• horizontal = An integer value representing the horizontal.<br>• vertical = An integer value representing the vertical. May have an additional qualifier such as "p" or "i".<br>• rate = An integer value representing the refresh rate.<br>Example:<br>`SEND_COMMAND dvRX,"'?VIDOUT_RES'"`<br>Returns a COMMAND of the form:<br>`VIDOUT_RES-<horizontal>x<vertical>,<rate>` |
| **?VIDOUT_ASPECT_RATIO**<br>Requests the aspect ratio conversion policy of the video through the Receiver.<br>(For explanations of the ratio options, see page 70.) | Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDOUT_ASPECT_RATIO'"`<br>Valid responses:<br>ratio = STRETCH (default after FACTORYAV), MAINTAIN, ZOOM, ANAMORPHIC<br>Example:<br>`SEND_COMMAND dvRX,"'?VIDOUT_ASPECT_RATIO'"`<br>Returns a COMMAND of the form:<br>`VIDOUT_ASPECT_RATIO-<ratio>` |
| **VIDOUT_ASPECT_RATIO**<br>Sets the aspect ratio conversion policy of the video through the Receiver to Stretch, Maintain, Zoom, or Anamorphic.<br>(For explanations of the ratio options, see page 70.) | Syntax:<br>`SEND_COMMAND <DEV>,"'VIDOUT_ASPECT_RATIO-<ratio>'"`<br>Valid responses:<br>ratio = STRETCH, MAINTAIN, ZOOM, ANAMORPHIC<br>Example:<br>`SEND_COMMAND dvRX,"'VIDOUT_ASPECT_RATIO-ZOOM'"` |
| **?VIDOUT_TESTPAT**<br>Requests the test pattern setting on the Receiver. | Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDOUT_TESTPAT'"`<br>Valid responses:<br>pattern = OFF, COLOR BAR, GRAY RAMP, SMPTE BAR, HILOTRAK, PLUGE, X-HATCH<br>Example:<br>`SEND_COMMAND dvRX,"'?VIDOUT_TESTPAT'"`<br>Returns a COMMAND of the form:<br>`VIDOUT_TESTPAT-<pattern>` |
| **VIDOUT_TESTPAT**<br>Sets the test pattern to display. Can be sent in any Scaling Mode. | Syntax:<br>`SEND_COMMAND <DEV>,"'VIDOUT_TESTPAT-<pattern>'"`<br>Valid responses:<br>pattern = OFF, COLOR BAR, GRAY RAMP, SMPTE BAR, HILOTRAK, PLUGE, X-HATCH<br>Example:<br>`SEND_COMMAND dvRX,"'VIDOUT_TESTPAT-COLOR BAR'"` |
| **?VIDOUT_MUTE**<br>Requests the setting for the Mute preference applied to the image from the Receiver (Enable or Disable). | Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDOUT_MUTE'"`<br>Example:<br>`SEND_COMMAND dvRX,"'?VIDOUT_MUTE'"`<br>Returns a COMMAND of the form:<br>`VIDOUT_MUTE-<ENABLE\|DISABLE>` |
| **VIDOUT_MUTE**<br>Sets the Mute preference of the image from the Receiver to Enable (displays a blank screen) or Disable. | Syntax:<br>`SEND_COMMAND <DEV>,"'VIDOUT_MUTE-<ENABLE\|DISABLE>'"`<br>Example:<br>`SEND_COMMAND dvRX,"'VIDOUT_MUTE-ENABLE'"` |

### Aspect Ratio Conversion Policy Options

**Note:** *The commands for setting/verifying the aspect ratio conversion policy are on the previous page.*

**Stretch** (to fit) – This aspect ratio conversion policy option (default) scales the video to full screen size in both horizontal and vertical directions regardless of the input aspect ratio. No data is cropped. However, the image may be distorted as needed to fill the screen. When Stretch is selected, black bars are not added by the scaler. However, if an image has originated from a source device with either horizontal or vertical black bars (e.g., letter box from a movie), the black bars will be considered as active video and will be included in the stretched video.

**Maintain (**aspect ratio) – This aspect ratio conversion policy option maintains the incoming video's aspect ratio, but will scale the image until the display fills either horizontal or vertical direction first. If the vertical direction is filled first, then the video will have pillar box black bars on the sides of the display. If the horizontal direction is filled first, then the video will have letter box black bars on the top and bottom of the display.

**Zoom** – This aspect ratio conversion policy option maintains the input aspect ratio while zooming the image to fill the screen in all directions. Image data may be lost on the top and bottom or to the left and right of the displayed image.

**Anamorphic** – This aspect ratio conversion policy option is used with anamorphic formatted video sources so that the images appear correctly on the display.

## DXLink Fiber Receiver Audio SEND_COMMANDs

DXLink Fiber Receiver Audio SEND_COMMANDs are sent to Port 6.

| Audio SEND_COMMANDs (Receivers) | |
|---|---|
| **Command** | **Description** |
| **?AUDOUT_MUTE**<br>Requests the setting for the Mute preference of the audio from the Receiver (Enable or Disable). | Syntax:<br>`SEND_COMMAND <DEV>,"'?AUDOUT_MUTE'"`<br>Example:<br>`SEND_COMMAND dvRX,"'?AUDOUT_MUTE'"`<br>Returns a COMMAND of the form:<br>`AUDOUT_MUTE-<ENABLE\|DISABLE>` |
| **AUDOUT_MUTE**<br>Sets the Mute preference of the audio from the Receiver to Enable (no sound) or Disable. | Syntax:<br>`SEND_COMMAND <DEV>,"'AUDOUT_MUTE-<ENABLE\|DISABLE>'"`<br>Example:<br>`SEND_COMMAND dvRX,"'AUDOUT_MUTE-ENABLE'"` |
| **?AUDOUT_FORMAT**<br>Requests the audio format on the Receiver. | Syntax:<br>`SEND_COMMAND <DEV>,"'?AUDOUT_FORMAT'"`<br>Valid responses:<br>format = HDMI, ANALOG, ALL<br>Example:<br>`SEND_COMMAND dvRX,"'?AUDOUT_FORMAT'"`<br>Returns a COMMAND of the form:<br>`AUDOUT_FORMAT-<format>` |
| **AUDOUT_FORMAT**<br>Sets the audio format on the Receiver (default is ALL). | Syntax:<br>`SEND_COMMAND <DEV>,"'AUDOUT_FORMAT-<format>'"`<br>Valid responses:<br>format = HDMI, ANALOG, ALL<br>Example:<br>`SEND_COMMAND dvRX,"'AUDOUT_FORMAT-ANALOG'"` |

# DXLink Fiber Transmitter Video SEND_COMMANDs

DXLink Fiber Transmitter Video SEND_COMMANDs are sent to Port 7 unless otherwise noted.

**Note:** *Asynchronous notifications are available for the Transmitters via NetLinx Studio (and Telnet).*

**Note:** *All text is based on a Unicode index.*

| Video SEND_COMMANDs (Transmitters) | |
|---|---|
| **Command** | **Description** |
| **?VIDIN_AUTO_SELECT**<br>Requests the setting for the Auto Select mode for the video input signal on the Transmitter (Enable, Analog or Disable). | **Important:** *This command must be sent to Port 1.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_AUTO_SELECT'"`<br>Example:<br>`SEND_COMMAND dvTX,"'?VIDIN_AUTO_SELECT'"`<br>Returns a COMMAND of the form:<br>`VIDIN_AUTO_SELECT-<ENABLE\|DISABLE\|ANALOG>` |
| **VIDIN_AUTO_SELECT**<br>Enables or disables the Auto Select mode for the video input signal on the Transmitter.<br>• ENABLE – sets the Auto Select mode for digital preference (the factory default is digital).<br>• ANALOG – sets the Auto Select mode to analog preference.<br>• DISABLE – disables Auto Select. | **Important:** *This command must be sent to Port 1.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_AUTO_SELECT-<ENABLE\|DISABLE>'"`<br>Valid responses:<br>value = ENABLE \| DISABLE \| ANALOG<br>Example:<br>`SEND_COMMAND dvTX,"'VIDIN_AUTO_SELECT-ENABLE'"`<br>**Note:** *VIDIN_AUTO_SELECT must be set to "DISABLE" for a VIDIN_FORMAT command to take effect.* |
| **?INPUT-VIDEO**<br>Requests the video input being used on the Transmitter: either the digital video (Input 7) or the analog video (Input 8). The output is always 6. | **Important:** *This command must be sent to Port 1.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?INPUT-VIDEO,6'"`<br>Example:<br>`SEND_COMMAND dvTX,"'?INPUT-VIDEO,6'"`<br>Returns a COMMAND of the form:<br>`SWITCH-LVIDEOI8O6`<br>**Note:** If the VIDIN_AUTO_SELECT state is either ENABLE or ANALOG and no content is being passed (nothing is connected to either the digital or analog ports), then the query returns a COMMAND of the form:<br>`SWITCH-LVIDEOI0O6` |
| **VI<input>O<output>**<br>Sets the Transmitter to route either the digital video (Input 7) or the analog video (Input 8) to the output (which is always Output 6). | **Important:** *This command must be sent to Port 1.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VI<input>O<output>'"`<br>Valid responses:<br>input = 7 for digital video; 8 for analog video<br>output = 6<br>Example:<br>`SEND_COMMAND dvTX,"'VI8O6'"`<br>**Note:** Setting the route to either digital or analog will also override the VIDIN_AUTO_SELECT setting to DISABLE if not already disabled. |

| Video SEND_COMMANDs (Transmitters), continued | |
|---|---|
| **?VIDIN_STATUS**<br>Requests the status of the video input on the Transmitter. | **Important:** *Send to Port 7 for digital video and Port 8 for analog video.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_STATUS'"`<br>Valid responses:<br>status = NO SIGNAL, UNKNOWN SIGNAL, VALID SIGNAL<br>Example:<br>`SEND_COMMAND dvTX,"'?VIDIN_STATUS'"`<br>Returns a COMMAND of the form:<br>`VIDIN_STATUS-<status>` |
| **?VIDIN_FORMAT**<br>Requests the video format on the Transmitter.<br>**Note:** *When this query is sent to port 7, the response reflects the format of digital content if there is any digital content. If there is no digital content, it will report UNKNOWN.* | **Important:** *Send to Port 7 for digital video and to Port 8 for analog video.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_FORMAT'"`<br>Valid responses:<br>format (Port 7) = HDMI, DVI<br>format (Port 8) = COMPONENT, S-VIDEO, COMPOSITE, VGA<br>Example:<br>`SEND_COMMAND dvTX,"'?VIDIN_FORMAT'"`<br>Returns a COMMAND of the form:<br>`VIDIN_FORMAT-<format>` |
| **VIDIN_FORMAT**<br>Sets the video format on the Transmitter.<br>**Important:** *For RGsB video signals, you must use the VIDIN_FORMAT command and set the "valid responses" format to VGA.* | **Important:** *Send to Port 8 for analog video.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_FORMAT-<format>'"`<br>Valid responses:<br>format = COMPONENT, S-VIDEO, COMPOSITE, VGA<br>Example:<br>`SEND_COMMAND dvTX,"'VIDIN_FORMAT-COMPONENT'"`<br>**Note:** *VIDIN_AUTO_SELECT must be set to "DISABLE" for a VIDIN_FORMAT command to take effect.* |
| **?VIDIN_RES_AUTO**<br>Requests the setting for the Auto mode on the Transmitter (Enable or Disable). | **Note:** *Send to Port 8.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_RES_AUTO'"`<br>Example:<br>`SEND_COMMAND dvTX,"'?VIDIN_RES_AUTO'"`<br>Returns a COMMAND of the form:<br>`VIDIN_RES_AUTO-<ENABLE\|DISABLE>` |
| **VIDIN_RES_AUTO**<br>Enables or disables the Auto mode (for automatically determining the resolution) on the Transmitter. | **Note:** *Send to Port 8.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_RES_AUTO-<ENABLE\|DISABLE>'"`<br>Example:<br>`SEND_COMMAND dvTX,"'VIDIN_RES_AUTO-ENABLE'"` |

| Video SEND_COMMANDs (Transmitters), continued | |
|---|---|
| **?VIDIN_RES_REF**<br>Requests the resolution and refresh rate of the video through the Transmitter. | **Important:** *Send to Port 7 for digital video and Port 8 for analog video.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_RES_REF'"`<br>Valid responses:<br>• horizontal = An integer value representing the horizontal.<br>• vertical = An integer value representing the vertical. May have an additional qualifier such as "i" or "p".<br>• rate = An integer value representing the refresh rate.<br>Example:<br>`SEND_COMMAND dvTX,"'?VIDIN_RES_REF'"`<br>Returns a COMMAND of the form:<br>`VIDIN_RES_REF-<horizontal>x<vertical>,<rate>`<br>**Note:** If no signal is connected to the port being requested, then the response will be `VIDIN_RES_REF-0x0,0`.<br>**Note:** If analog video is currently routed and the resolution of the digital video (Port 7) is requested, then the response will be `VIDIN_RES_REF-0x0,0` even if digital video is present. |
| **?VIDIN_PREF_EDID**<br>Requests the preferred resolution of the EDID source for the VGA video or HDMI digital input. | **Important:** *Send to Port 7 for digital video and Port 8 for analog video.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_PREF_EDID'"`<br>Example:<br>`SEND_COMMAND dvTX,"'?VIDIN_PREF_EDID'"`<br>Returns a COMMAND of the form:<br>`VIDIN_PREF_EDID-<resolution,refresh>` |
| **VIDIN_PREF_EDID**<br>Sets the preferred resolution of the EDID source for the VGA video or HDMI digital input. | **Important:** *Send to Port 7 for digital video and Port 8 for analog video.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_PREF_EDID -<resolution,refresh>'"`<br>Valid responses:<br>• resolution,refresh = <for supported input resolutions and refresh rates, see the tables starting on page 119><br>Examples:<br>`SEND_COMMAND dvTX,"'VIDIN_PREF_EDID-1920x1080p,60'"` |
| **?VIDIN_EDID**<br>Requests which EDID is being presented to the source on the video port addressed by the D:P:S. | **Important:** *Send to Port 7 for digital video and Port 8 for analog video.*<br>Syntax:<br>`SEND_COMMAND <DEV>, "'?VIDIN_EDID'"`<br>Example:<br>`SEND_COMMAND VIDEO_INPUT_1,"'?VIDIN_EDID'"`<br>Returns a COMMAND of the form:<br>`VIDIN_EDID-<source>`<br>For the potential sources, see the VIDIN_EDID command. |
| **VIDIN_EDID**<br>Sets the EDID to be presented to the source on the video port addressed by the D:P:S.<br><br>**Note:** *For additional information on EDID management and the EDID variables used with this command, see page 130.* | **Important:** *Send to Port 7 or 8 unless specified otherwise.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_EDID-<source>'"`<br>Valid responses:<br>source = ALL RESOLUTIONS, USER EDID 1*, USER_EDID_MODIFIED, FULL-SCREEN, WIDE-SCREEN, MIRROR OUT 1**, MIRROR_OUT_LOCAL (Port 7 only)<br>Example:<br>`SEND_COMMAND VIDEO_INPUT_1,"'VIDIN_EDID-ALL RESOLUTIONS'"`<br>* "USER EDID 1" must be written to the TX using DGX Configuration Software (via the USB Program port) or to the DXLink Fiber Input Board.<br>** The HDMI port mirrors the downstream EDID of the connected DXLink device. When connected to a DXLink Input Board, this EDID will be the same as USER EDID 1. |

| Video SEND_COMMANDs (Transmitters), continued | |
|---|---|
| **?VIDIN_HDCP**<br>Requests the video HDCP compliance setting of the video input port addressed by the D:P:S. | **Important:** *Send to Port 7.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_HDCP'"`<br>Example:<br>`SEND_COMMAND VIDEO_INPUT_1,"'?VIDIN_HDCP'"`<br>Returns a COMMAND of the form:<br>`VIDIN_STATUS-<ENABLE\|DISABLE>` |
| **VIDIN_HDCP**<br>Sets the video HDCP compliance setting of the video input port addressed by the D:P:S.<br>**Important:** *For sources (such as DVD and Blu-Ray players) that do not support non-compliant displays, disabling the HDCP compliance is not recommended and may affect DXLink Fiber performance.* | **Important:** *Send to Port 7.*<br>**Note:** *When VIDIN_HDCP is disabled, the addressed video input will appear to any source as not being HDCP compliant. For PC sources that encrypt all video when connected to an HDCP compliant display, disabling HDCP compliance on the input will cause the PC to send non-encrypted video which can then be routed to non-compliant displays and video conferencing systems.*<br>This command is not applicable to the analog video port.<br>**Note:** *After changing this setting, it may be necessary to disconnect and re-connect PC sources.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_HDCP-<ENABLE\|DISABLE>'"`<br>Example:<br>`SEND_COMMAND dvTX,"'VIDIN_HDCP-ENABLE'"`<br>Enables the HDCP Compliance of the video input port (#1 based on D:P:S). |
| **?VIDIN_VSHIFT**<br>Requests the vertical shift value of the analog video input port addressed by the D:P:S. | **Important:** *Send to Port 8.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_VSHIFT'"`<br>Example:<br>`SEND_COMMAND VIDEO_INPUT_8,"'?VIDIN_VSHIFT'"`<br>Returns a COMMAND of the form (the value will be numerical ranging from -7 to 7):<br>`VIDIN_VSHIFT-<value>` |
| **VIDIN_VSHIFT**<br>Sets the vertical shift value of the analog video input port addressed by the D:P:S. | **Important:** *Send to Port 8.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_VSHIFT-<value>'"`<br>Valid responses:<br>value = -7. . .7<br>Example:<br>`SEND_COMMAND dvTX,"'VIDIN_VSHIFT-2'"`<br>Sets the vertical shifting of analog video input port (#1 based on D:P:S) to 2 (shift upward).<br>`SEND_COMMAND "'VIDIN_VSHIFT--3'"`<br>Sets the vertical shifting of analog video input port (#1 based on D:P:S) to -3 (shift downward). |
| **?VIDIN_HSHIFT**<br>Requests the horizontal shift value of the analog video input port addressed by the D:P:S. | **Important:** *Send to Port 8.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_HSHIFT'"`<br>Example:<br>`SEND_COMMAND VIDEO_INPUT_1,"'?VIDIN_HSHIFT'"`<br>Returns a COMMAND of the form (the value will be numerical ranging from -50 to 50):<br>`VIDIN_HSHIFT-<value>` |

| Video SEND_COMMANDs (Transmitters), continued | |
|---|---|
| **VIDIN_HSHIFT**<br>Sets the horizontal shift value of the analog video input port addressed by the D:P:S. | **Important:** *Send to Port 8.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_HSHIFT-<value>'"`<br>Valid responses:<br>value = -50. . .50<br>Examples:<br>`SEND_COMMAND "'VIDIN_HSHIFT-2'"`<br>Sets the horizontal shifting of video input port (#1 based on D:P:S) to 2 (shift to right).<br>`SEND_COMMAND "'VIDIN_HSHIFT--3'"`<br>Sets the horizontal shifting of video input port (#1 based on D:P:S) to -3 (shift to left). |
| **?VIDIN_PHASE**<br>Requests the input phase of the RGB video input port addressed by the D:P:S. | **Important:** *Send to Port 8.*<br>This command is valid only for inputs whose format is set to VGA.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'?VIDIN_PHASE'"`<br>Example:<br>`SEND_COMMAND VIDEO_INPUT_1,"'?VIDIN_PHASE'"`<br>Returns a COMMAND of the form (the value will be numerical ranging from 0 to 31):<br>`VIDIN_PHASE-<value>` |
| **VIDIN_PHASE**<br>Sets the input phase of the RGB video input port addressed by the D:P:S. | **Important:** *Send to Port 8.*<br>This command is valid only for inputs whose format is set to VGA.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'VIDIN_PHASE-<value>'"`<br>Valid responses:<br>value = 0. . .31<br>Example:<br>`SEND_COMMAND VIDEO_INPUT_1,"'VIDIN_PHASE-23'"` |

## DXLink Fiber Transmitter Audio SEND_COMMANDs

DXLink Fiber Transmitter Audio SEND_COMMANDs are sent to Port 7.

| Audio SEND_COMMANDs (Transmitters) | |
|---|---|
| **Command** | **Description** |
| **?AUDIN_FORMAT_AUTO**<br>Requests the setting (Enable or Disable) for automatically detecting the audio source format through the Transmitter. | Syntax:<br>`SEND_COMMAND <DEV>,"'?AUDIN_FORMAT_AUTO'"`<br>Example:<br>`SEND_COMMAND dvTX,"'?AUDIN_FORMAT_AUTO'"`<br>Returns a COMMAND of the form:<br>`AUDIN_FORMAT-AUTO<ENABLE\|DISABLE>` |
| **AUDIN_FORMAT_AUTO**<br>Sets audio source format to automatically detect the audio through the Transmitter. | Syntax:<br>`SEND_COMMAND <DEV>,"'AUDIN_FORMAT_AUTO-<ENABLE\|DISABLE>'"`<br>Example:<br>`SEND_COMMAND dvTX,"'AUDIN_FORMAT_AUTO-ENABLE'"` |
| **?AUDIN_FORMAT**<br>Requests the setting for the audio source format. | Syntax:<br>`SEND_COMMAND <DEV>,"'?AUDIN_FORMAT'"`<br>Valid responses:<br>format = HDMI, SPDIF, ANALOG<br>Example:<br>`SEND_COMMAND dvTX,"'?AUDIN_FORMAT'"`<br>Returns a COMMAND of the form:<br>`AUDIN_FORMAT-<format>` |

| Audio SEND_COMMANDs (Transmitters), continued | |
|---|---|
| **AUDIN_FORMAT**<br>Selects the audio input source that will be embedded on the HDMI signal through the Transmitter.<br>**Note:** *When the Transmitter is set to route digital video (input 7), you can select from the HDMI, SPDIF, or ANALOG audio inputs. When the Transmitter is set to route analog video (input 8), you can only select the SPDIF or ANALOG audio input (see the VI<input>O<output> command on page 71.* | Syntax:<br>`SEND_COMMAND <DEV>,"'AUDIN_FORMAT-<format>'"`<br>Valid responses:<br>format = HDMI, SPDIF, ANALOG<br>Example:<br>`SEND_COMMAND dvTX,"'AUDIN_FORMAT-ANALOG'"`<br>**Important:** *The order of precedence (HDMI embedded audio, S/PDIF, analog) can be overridden with this command; however, you must first send* AUDIN_FORMAT_AUTO-DISABLE *to disable the auto format function, or the audio format will automatically switch back anytime the order of precedence is violated.* |

# IR SEND_COMMANDs

On the DXLink Fiber Transmitters and Receivers, IR CHANNELS and SEND_COMMANDs are sent to Port 3 (IR output).

## IR CHANNELs

| Channel | Function |
|---|---|
| 1-255 | Generate the IR or serial command assigned to that channel. |

## IR SEND_COMMANDs

| IR SEND_COMMANDs (Transmitters and Receivers) | |
|---|---|
| **Command** | **Description** |
| **CAROFF**<br>Disable the IR carrier signal until a 'CARON' Send Command is received. | Syntax:<br>`SEND_COMMAND <DEV>,"'CAROFF'"`<br>Example:<br>`SEND_COMMAND IR_1,"'CAROFF'"`<br>Stops transmitting IR carrier signals to the IR port. |
| **CARON**<br>Enable the IR carrier signals (default). | Syntax:<br>`SEND_COMMAND <DEV>,"'CARON'"`<br>Example:<br>`SEND_COMMAND IR_1,"'CARON'"`<br>Starts transmitting IR carrier signals to the IR port. |

| IR SEND_COMMANDs (Transmitters and Receivers), continued | |
|---|---|
| **CH**<br>Send IR pulses for the selected channel. | • All channels below 100 are transmitted as two digits.<br>• If the IR code for ENTER (function #21) is loaded, an Enter will follow the number.<br>• If the channel is greater than or equal to (>=) 100, then IR function 127 or 20 (whichever exists) is generated for the one hundred digit.<br>**Note:** *Set the Pulse and Wait times with 'CTON' (see page 77) and 'CTOF' (see page 77).*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'CH',<channel number>"`<br>Valid responses:<br>channel number = 0 to 199 channels<br>Example:<br>`SEND_COMMAND IR_1,"'CH',18"`<br>The IR port on the DXLink Fiber TX or RX performs the following:<br>• Transmits IR signals for 1 (IR code 11).<br>• The transmit time is set with the CTON command.<br>• Waits until the time set with the CTOF command elapses.<br>• Transmits IR signals for 8 (IR code 18).<br>• Waits for the time set with the CTOF command elapses.<br>If the IR code for Enter (IR code 21) is programmed, the unit performs the following steps:<br>• Transmits IR signals for Enter (IR code 21).<br>• Waits for the time set with the CTOF command elapses. |
| **CP**<br>Halt and clear all active or buffered IR commands, and then send a single IR pulse. | Pulse and Wait times can be set with the 'CTON' and 'CTOF' commands.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'CP',<code>"`<br>Valid responses:<br>code = IR port's channel value 0 to 252 (253 to 255 reserved).<br>Example:<br>`SEND_COMMAND IR_1,"'CP',2"`<br>Clears the active/buffered commands and pulses IR port's channel 2. |
| **CTOF**<br>Set the duration of the Off time (no signal) between IR pulses for channel and IR function transmissions. Off time settings are stored in non-volatile memory. | This command sets the delay time between pulses generated by the 'CH' or 'XCH' Send Commands in tenths of seconds.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'CTOF',<time>"`<br>Valid responses:<br>time = 0 to 255. Given in 1/10th of a second increments. Default is 5 (0.5 seconds).<br>Example:<br>`SEND_COMMAND IR_1,"'CTOF',10"`<br>Sets the off time between each IR pulse to 1 second. |
| **CTON**<br>Set the total time of IR pulses transmitted and is stored in non-volatile memory. | This command sets the pulse length for each pulse generated by the 'CH' (see page 77) or 'XCH' (see page 78) Send Commands in tenth of a second increments.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'CTON',<time>"`<br>Valid responses:<br>time = 0 to 255. Given in 1/10th of a second increments. Default is 5 (0.5 seconds).<br>Example:<br>`SEND_COMMAND IR_1,"'CTON',20"`<br>Sets the IR pulse duration to 2 seconds. |

| IR SEND_COMMANDs (Transmitters and Receivers), continued | |
|---|---|
| **GET BAUD**<br>Get the IR port's current communication parameters. | The port sends the parameters to the device that requested the information.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'GET BAUD'"`<br>Example:<br>`SEND_COMMAND dvRXRS232,"'GET BAUD'"`<br>The port responds with:<br>`Port <port #>,<baud>,<parity>,<data>,<stop>` |
| **GET MODE**<br>Poll the IR/Serial port's configuration parameters and report the active mode settings to the device requesting the information.<br>**Note:** *Works with Port 3 only.* | Syntax:<br>`GET MODE`<br>The port responds with:<br>`<port #> <mode>,<carrier>,<io link channel>.`<br>Example:<br>`SEND_COMMAND IR_1,"'GET MODE'"`<br>The system could respond with:<br>`PORT 3 IR,CARRIER,IO LINK 0` |
| **IROFF**<br>Halt and clear all active or buffered IR commands being output on the designated port. | Syntax:<br>`SEND_COMMAND <DEV>,"'IROFF'"`<br>Example:<br>`SEND_COMMAND IR_1,"'IROFF'"`<br>Immediately halts and clears all IR output signals on the IR port. |
| **SET BAUD**<br>Use to set the IR communication parameters.<br><br>**Note:** *Before sending the SET BAUD command, you must set the IR port to Data mode (for the SET MODE command, see next entry in table)* | **Note:** *This value is not saved in non-volatile memory and is reset to default (9600, N, 8, 1) at power-up.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'SET BAUD <baud>,<parity>,<data>, <stop>'"`<br>Valid responses:<br>• baud = 9600, 4800, 2400, 1200, 600, 300, 150<br>• parity = N (none), O (odd), E (even), M (mark), S (space)<br>• data = 7 or 8 data bits<br>• stop = 1 or 2 stop bits<br><br>**Note:** *The only valid 9 bit combination is (baud),N,9,1.*<br>Example:<br>`SEND_COMMAND DEVICE_1,"'SET BAUD 1200,N,8,1'"`<br>Sets the DEVICE_1 port's communication parameters to 1200 baud, no parity, 8 data bits, and 1 stop bit. |
| **XCH**<br>Transmit IR codes. | Syntax:<br>`SEND_COMMAND <DEV>,"'XCH <channel>'"`<br>Valid responses:<br>channel = 0 to 999.<br>**Note:** *For detailed usage examples, refer to the 'XCHM' command (see page 79).* |
| **SET MODE**<br>Set an IR port to either IR, Serial, or Data mode. | Syntax:<br>`SEND_COMMAND <DEV>,"'SET MODE',<mode>"`<br>Valid responses:<br>mode =<br>• IR (standard IR output with carrier)<br>• SERIAL (IR without carrier and waveform inverted)<br>• DATA (1-way serial/TTL)<br>Example:<br>`SEND_COMMAND IR_1,"'SET MODE IR'"`<br>Sets the IR_1 port to IR mode for IR control. |

| IR SEND_COMMANDs (Transmitters and Receivers), continued | |
|---|---|
| **SP**<br>Generate a single IR pulse. | You can use the 'CTON' to set pulse lengths and the 'CTOF' to set time Off between pulses.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'SP',<code>"`<br>Valid responses:<br>code = IR code value 1 to 252 (253 to 255 reserved).<br>Example:<br>`SEND_COMMAND IR_1,"'SP',25"`<br>Pulses IR code 25 on IR port on the RX. |
| **XCHM**<br>Changes the IR output pattern for the 'XCH' Send Command. | Syntax:<br>`SEND_COMMAND <DEV>,"'XCHM <extended channel mode>'"`<br>Valid responses:<br>extended channel mode = 0 to 4.<br>Example:<br>`SEND_COMMAND IR_1,"'XCHM 3'"`<br>Sets the IR device's extended channel command to mode 3.<br>**Mode 0 Example (default): [x][x]<x><enter>**<br>`SEND_COMMAND IR_1,"'XCH 3'"`<br>Transmits the IR code as 3-enter.<br>`SEND_COMMAND IR_1,"'XCH 34'"`<br>Transmits the IR code as 3-4-enter.<br>`SEND_COMMAND IR_1,"'XCH 343'"`<br>Transmits the IR code as 3-4-3-enter.<br>**Mode 1 Example: <x><x><x><enter>**<br>`SEND_COMMAND IR_1,"'XCH 3'"`<br>Transmits the IR code as 0-0-3-enter.<br>`SEND_COMMAND IR_1,"'XCH 34'"`<br>Transmits the IR code as 0-3-4-enter.<br>`SEND_COMMAND IR_1,"'XCH 343'"`<br>Transmits the IR code as 3-4-3-enter.<br>**Mode 2 Example: <x><x><x>**<br>`SEND_COMMAND IR_1,"'XCH 3'"`<br>Transmits the IR code as 0-0-3.<br>`SEND_COMMAND IR_1,"'XCH 34'"`<br>Transmits the IR code as 0-3-4.<br>`SEND_COMMAND IR_1,"'XCH 343'"`<br>Transmits the IR code as 3-4-3.<br>**Mode 3 Example: [[100][100]....]<x><x>**<br>`SEND_COMMAND IR_1,"'XCH 3'"`<br>Transmits the IR code as 0-3.<br>`SEND_COMMAND IR_1,"'XCH 34'"`<br>Transmits the IR code as 3-4.<br>`SEND_COMMAND IR_1,"'XCH 343'"`<br>Transmits the IR code as 100-100-100-4-3.<br>**Mode 4 Example:**<br>• Mode 4 sends the same sequences as the 'CH' command.<br>• Only use Mode 4 with channels 0 to 199. |

## Serial SEND_COMMANDs

On the DXLink Fiber units, SERIAL SEND_COMMANDs are sent to Port 1.

| Serial SEND_COMMANDs (Transmitters and Receivers) | |
|---|---|
| **Command** | **Description** |
| **B9MOFF**<br>Set the port's communication parameters for stop and data bits according to the software settings on the RS-232 port. | This command works in conjunction with the 'B9MON' command.<br>• Disables 9-bit in 232 mode.<br>• By default, this returns the Communication settings on the serial port to the last programmed parameters.<br>Syntax:<br>`B9MOFF`<br>Example:<br>`SEND_COMMAND SOMEDEVICE_1,"'B9MOFF'"`<br>Sets the port settings on SOMEDEVICE to match the port's configuration settings. |
| **B9MON**<br>Override and set the current communication settings and parameters on the RS-232 serial port to 9 data bits with one stop bit. | This command works in conjunction with the 'B9MOFF' command.<br>• Enables 9-bit in 232 mode.<br>Syntax:<br>`B9MON`<br>Example:<br>`SEND_COMMAND SOMEDEVICE_1,"'B9MON'"`<br>Resets the SOMEDEVICE port's communication parameters to 9 data bits and one stop bit. |
| **CHARD**<br>Set the delay time between all transmitted characters to the value specified (in 100 microsecond increments). | Syntax:<br>`SEND_COMMAND <DEV>,"'CHARD-<time>'"`<br>Valid responses:<br>time = 0 to 10000 (1 second)<br>Example:<br>`SEND_COMMAND dvRXRS232,"'CHARD-10'"`<br>Sets a 1-millisecond delay between all transmitted characters. |
| **CHARDM**<br>Set the delay time between all transmitted characters to the value specified (in 1 millisecond increments). | Syntax:<br>`SEND_COMMAND <DEV>,"'CHARDM-<time>'"`<br>Valid responses:<br>time = 0 to 1000 (1 second)<br>Example:<br>`SEND_COMMAND dvRXRS232,"'CHARDM-10'"`<br>Sets a 10-millisecond delay between all transmitted characters. |
| **ESCSEQOFF**<br>Disables SEND_STRING escape sequences | Disables SEND_STRING escape sequences (see the "SEND_STRING Escape Sequences" section on page 85). |
| **ESCSEQON**<br>Enables SEND_STRING escape sequences | Enables SEND_STRING escape sequences (see the "SEND_STRING Escape Sequences" section on page 85). |
| **GET BAUD**<br>Get the RS-232 (serial) port's current communication parameters. | The port sends the parameters to the device that requested the information.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'GET BAUD'"`<br>Example:<br>`SEND_COMMAND dvRXRS232,"'GET BAUD'"`<br>The port responds with:<br>`Port <port #>,<baud>,<parity>,<data>,<stop>` |

| Serial SEND_COMMANDs (Transmitters and Receivers), continued | |
|---|---|
| **RXCLR**<br>Clear all characters in the receive buffer waiting to be sent to the Master. | Syntax:<br>`SEND_COMMAND <DEV>,"'RXCLR'"`<br>Example:<br>`SEND_COMMAND dvRXRS232,"'RXCLR'"`<br>Clears all characters in the receive buffer waiting to be sent to the Master. |
| **RXOFF**<br>Disable the transmission of incoming received characters to the Master (default). | Syntax:<br>`SEND_COMMAND <DEV>,"'RXOFF'"`<br>Example:<br>`SEND_COMMAND dvRXRS232,"'RXOFF'"`<br>Disables the transmission of incoming received characters to the Master. |
| **RXON**<br>Start transmitting received characters to the Master. Enables sending incoming received characters to the Master. | This command is automatically sent by the Master when a 'CREATE_BUFFER' program instruction is executed.<br>Syntax:<br>`SEND_COMMAND <DEV>,"'RXON'"`<br>Example:<br>`SEND_COMMAND dvRXRS232,"'RXON'"`<br>Sets the RX RS-232 port to transmit received characters to the Master. |
| **TXCLR**<br>Stop and clear all characters waiting in the transmit out buffer and stops transmission. | Syntax:<br>`SEND_COMMAND <DEV>,"'TXCLR'"`<br>Example:<br>`SEND_COMMAND dvRXRS232,"'TXCLR'"`<br>Stops and clears all characters waiting in the RX serial port's transmit buffer. |
| **SET BAUD**<br>(shown in examples)<br>Or<br>**TSET BAUD**<br>Use either of these commands to set the serial communication parameters.<br>**Note:** *The DXLink Fiber Transmitters and Receivers only support RS-232 serial communication.* | **Note:** *This value is not saved in non-volatile memory and is reset to default (9600, 8, N, 1) at power-up.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'SET BAUD <baud>,<parity>,<data>, <stop>'"`<br>Valid responses:<br>• baud = 115200, 76800, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300, 150.<br>• parity = N (none), O (odd), E (even), M (mark), S (space)<br>• data = 7 or 8 data bits<br>• stop = 1 or 2 stop bits<br>**Note:** *The only valid 9 bit combination is (baud),N,9,1.*<br>Example:<br>`SEND_COMMAND DEVICE_1,"'SET BAUD 115200,N,8,1'"`<br>Sets the DEVICE_1 port's communication parameters to 115,200 baud, no parity, 8 data bits, and 1 stop bit. |

## DXLink Fiber Transmitter USB SEND_COMMANDs

On the DXLink Transmitter, USB SEND_COMMANDs are sent to Port 5.

| USB SEND-COMMANDs (Transmitter) | |
|---|---|
| **Command** | **Description** |
| **?USB_HID_SERVICE**<br>Requests the status for the USB HID pass through setting (Enable or Disable). | Syntax:<br>`SEND_COMMAND <DEV>,"'?USB_HID_SERVICE'"`<br>Example:<br>`SEND_COMMAND dvTX,"'?USB_HID_SERVICE'"`<br>Returns a COMMAND of the form:<br>`USB_HID_SERVICE-<ENABLE/DISABLE>` |
| **USB_HID_SERVICE**<br>Sets the USB HID pass through to Enable or Disable. | **Note:** *When enabled, the USB port addressed by D:P:S is running in auto switching mode.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'USB_HID_SERVICE-<ENABLE\|DISABLE>'"`<br>Example:<br>`SEND_COMMAND dvTX,"'USB_HID_SERVICE-ENABLE'"`<br>**Note:** *This command persists through power cycling.* |

## DXLink Fiber Receiver USB SEND_COMMANDs

On the DXLink Receiver, USB SEND_COMMANDs are sent to Port 5.

| USB SEND-COMMANDs (Receiver) | |
|---|---|
| **Command** | **Description** |
| **?USB_HID_ROUTE**<br>Requests the IP address or hostname of the host device (Transmitter) sending USB keyboard/ mouse data to the Receiver. | Syntax:<br>`SEND_COMMAND <DEV>,"'?USB_HID_ROUTE'"`<br>Example:<br>`SEND_COMMAND dvRX,"'?USB_HID_ROUTE'"`<br>Returns a COMMAND of the form:<br>`USB_HID_ROUTE-<IP address or hostname>` |
| **USB_HID_ROUTE**<br>Set the IP address or hostname of the host device (Transmitter) that will be sending USB keyboard/mouse data to the Receiver. | **Important:** For hostname usage, check to be sure name resolution service (DNS) is running on the local network (LAN).<br>**Note:** *When a hostname is specified, a maximum of 50 characters can be used.*<br>Syntax:<br>`SEND_COMMAND <DEV>,"'USB_HID_ROUTE-<IP address or hostname>'"`<br>Example:<br>`SEND_COMMAND dvRX,"'USB_HID_ROUTE-192.168.1.5'"`<br>**Note:** *To eliminate the connection, specify 0.0.0.0 as the IP address. To redirect to a new host device (Transmitter), send the new IP address or hostname.* |

## Common DXLink Fiber TX/ RX SEND_COMMANDs

Common NetLinx SEND_COMMANDs for the DXLink Fiber Transmitters and Receivers are provided in the following table. These commands can be sent to any valid port (Port 1 through Port 8); the #3 Toggle *must* be set to ON.

**Common NetLinx SEND-COMMANDs (Transmitters and Receivers)**

| Command | Description |
|---|---|
| **?FWVERSION**<br>Requests the firmware version of the Transmitter or Receiver. | Syntax:<br>`SEND_COMMAND <DEV>,"'?FWVERSION'"`<br>Example:<br>`SEND_COMMAND dvRX,"'?FWVERSION'"`<br>Returns a COMMAND of the form:<br>`FWVERSION <version-string>` |
| **LED-DIS**<br>**Receivers:** Disable all LEDs to the right of the Program port.<br>**Transmitters:** Disable all LEDs to the right of the Power LED. | Syntax:<br>`LED-DIS`<br>Example:<br>`SEND_COMMAND DEVICE_1,"'LED-DIS'"`<br>**Receivers:** Disables all LEDs to the right of the Program port on DEVICE_1.<br>**Transmitters:** Disables all LEDs to the right of the Power LED on DEVICE_1.<br>**Note:** *This parameter does not get stored in non-volatile memory. LEDs are enabled by default at each power-up.* |
| **LED-EN**<br>**Receivers:** Enable all LEDs to the right of the Program port.<br>**Transmitters:** Enable all LEDs to the right of the Power LED. | Syntax:<br>`LED-EN`<br>Example:<br>`SEND_COMMAND DEVICE_1,"'LED-EN'"`<br>**Receivers:** Enables all LEDs to the right of the Program port on DEVICE_1.<br>**Transmitters:** Enables all LEDs to the right of the Power LED on DEVICE_1. |
| **REBOOT**<br>Reboot the unit. | Syntax:<br>`REBOOT`<br>Example:<br>`SEND_COMMAND DEVICE_1,"'REBOOT'"`<br>Reboots DEVICE_1. |
| **SET_NDX_DESC**<br>Set Friendly name and location for NDP. | Syntax:<br>`SET_NDX_DESC-friendly name:location`<br>Max of 25 characters for *friendly name* and max of 25 characters for *location*. If more than 25 characters are sent for either friendly name or location, they will be truncated to a max of 25 characters.<br>Neither the friendly name nor the location should contain a ":" character, as that is used as a delimiter.<br>**Note:** *This command requires a reboot to enable new settings.* |

## DXLink Fiber System SEND_COMMANDs

DXLink Fiber System SEND_COMMANDs can be sent to any valid port (Port 1 through Port 8) on the Transmitters or Receivers.

| DXLink Fiber System SEND_COMMANDs (Transmitters and Receivers) | |
|---|---|
| **Command** | **Description** |
| **ICSLAN**<br>Sets the ICS LAN connection to Enable or Disable. | Syntax:<br>`SEND_COMMAND <DEV>,"'ICSLAN-ENABLE\|DISABLE'"`<br>Example:<br>`SEND_COMMAND dvRX,"'ICSLAN-ENABLE'"` |
| **PERSISTAV**<br>**Receivers:** Persists the Scaler Mode, resolution, aspect ratio policy, and audio output type to the DXLink Fiber Output Board.<br>**Transmitters:** Disables the AUDIN_FORMAT_AUTO and persists the current audio format. | Syntax:<br>`SEND_COMMAND <DEV>,"'PERSISTAV'"`<br>Example:<br>`SEND_COMMAND <dvRX>,"'PERSISTAV'"` |
| **FACTORYAV**<br>**Receivers:** Clears the persisted settings for the Scaler Mode,* resolution, aspect ratio policy, and audio output type and restores them to their factory defaults.<br>* The “Power-On” Scaler Mode on an Enova DGX DXLink Fiber Output Board will not get reset to default (AUTO), but will remain as whatever was last persisted.<br>**Transmitters:** Clears the persisted setting for the audio and video formats and restores them to their factory defaults. Also restores the preferred EDID to the factory default on both inputs to All RESOLUTIONS. | Syntax:<br>`SEND_COMMAND <DEV>,"'FACTORYAV'"`<br>Example:<br>`SEND_COMMAND <dvTX>,"'FACTORYAV'"`<br>**Note:** *A reboot is required after sending the FACTORYAV command.*<br>**Note:** *When a Transmitter is connected to a DXLink Fiber Input Board, the input board will override the “ALL RESOLUTIONS” EDID and load the last stored EDID.* |

## SEND_STRING Escape Sequences

The DXLink Fiber units support several special SEND_STRING escape sequences. If any of the character combinations listed below are found anywhere within a SEND_STRING program instruction, they will be treated as a command and not the literal characters.

Use the ESCSEQON and ESCSEQOFF NetLinx SEND_COMMANDS to control whether these are active or not. The ESCSEQON command must precede the Escape Sequences, otherwise the strings will be processed normally.

These commands are sent to Port 1.

**SEND_STRING Escape Sequences**

| Command | Description |
|---|---|
| **27, 17**<br>Send a break character for a specified duration to a specific device. | Syntax:<br>`27,17,<time>`<br>Valid responses:<br>time = 1 to 255 (measured in 100 microsecond increments)<br>Example:<br>`SEND_STRING RS232_1,"27,17,10"`<br>Sends a break character of 1 millisecond to the RS232_1 device. |
| **27, 18, 0**<br>Clear the ninth data bit by setting it to 0 on all character transmissions. | Used in conjunction with the 'B9MON' command (see page 80).<br>Syntax:<br>`27,18,0`<br>Example:<br>`SEND_STRING RS232_1,"27,18,0"`<br>Sets the RS232_1 device's ninth data bit to 0 on all character transmissions. |
| **27, 18, 1**<br>Set the ninth data bit to 1 for all subsequent characters to be transmitted. | Used in conjunction with the 'B9MON' command (page 80).<br>Syntax:<br>`27,18,1`<br>Example:<br>`SEND_STRING RS232_1,"27,18,1"`<br>Sets the RS232_1 device's ninth data bit to 1 on all character transmissions. |
| **27, 19**<br>Insert a time delay before transmitting the next character. | Syntax:<br>`27,19,<time>`<br>Valid responses:<br>time = 1 to 255. Measured in 1 millisecond increments.<br>Example:<br>`SEND_STRING RS232_1,"27,19,10"`<br>Inserts a 10 millisecond delay before transmitting characters to the RS232_1 device. |

**Note:** *For a listing of all supported Telnet commands, see page 95.*

# Troubleshooting

## Overview

The troubleshooting suggestions/strategies provided apply to the DXLink Fiber Transmitters and Receivers unless otherwise noted.

Five potential types of issues are covered in this chapter:

- Basic troubleshooting
- Determining HDCP compliance
- Power
- DXLink Fiber
- Network setup

This chapter also provides technical support contact information on page 88.

## Basic Troubleshooting

We suggest using the following general list to rule out basic troubleshooting issues.

- ❑ Check the power indicator LEDs on all of the equipment. If any are not illuminated, see the "Power Issues" section below.
- ❑ Check all link and signal connections to make sure everything is physically set up correctly.
- ❑ Isolate source and destination equipment and cable problems by cabling direct without the DXLink Fiber units.
- ❑ If using SEND_COMMANDs – double-check the command and the port number specified and re-send the command (see page 66).
- ❑ If any changes have been made, try resetting the unit to the factory defaults (see page 59).

### Additional Resources for Troubleshooting Endpoint Systems

#### *Enova DGX Digital Media Switcher*

We suggest checking the troubleshooting information in the *Instruction Manual – Enova DGX 8/16/32/64 Digital Media Switchers*.

## Determining HDCP Compliance

A dark red or orange screen on an output display is the visual cue from the destination device that it cannot display the HDCP compliant signal from the source device (the authentication process has failed).

## Power Issues

Upon power up, the Power indicator LED on the front of the DXLink Fiber units normally illuminates a solid green. If the Power LEDs on any of the system's equipment are not illuminated:

- ❑ Check the power cords.
- ❑ Check the power connections on the source and destination devices.

## DXLink Fiber Troubleshooting

- Signal concerns – If you are experiencing general signal problems, it may be because of fiber cable quality issues. Be sure to check the "Fiber Optic Cable Requirements" section on page 41.
- Audio – If you are experiencing audio problems, it may be because you are trying to pass Dolby, DTS, or high PCM frequency rates and the destination device does not support them. Re-programming the EDID may help resolve the problem (see page 134).
- Video – If you are experiencing video problems, it may be because you are trying to pass a video format that the destination device does not support. Re-programming the EDID may help resolve the problem (see page 134).
- Verify optical signal (multimode transceivers only) – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable away from you and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if the signal is being passed (works on most digital cameras and cell phone cameras).

## Network Setup Issues

The instructions below can be used for first time setup of DXLink Fiber units on a network with no NetLinx Master (integrated).

**Note:** *Before setting up the network, we recommend plugging all required Ethernet cables into the network before applying power to the DXLink Fiber units.*

### To set the IP, connection, and device parameters on a DXLink Fiber unit:

1. Attach the DXLink Fiber unit via its ICS LAN 10/100 port to the network or PC.
2. Power up the DXLink Fiber unit.
3. The DXLink Fiber unit will get a DHCP address or default to 169.254.2.2 (or if the unit is in Static IP Mode, the address will be 192.168.1.2).
4. Establish a Telnet connection* to the DXLink Fiber unit and set up the network parameters using the following three commands:
   - `SET IP`
   - `SET CONNECTION`
   - `SET DEVICE`
5. Enter `REBOOT`.
6. Reset the DIP switches to configure the DXLink Fiber unit for the specific type of system setup being used (see the "Common Scenarios" table on page 40).

**Note:** *If you cannot locate the DXLink Fiber unit in the Online Tree, you can reset the factory default by holding the ID button during power up until the LEDs blink in unison and then releasing the ID button. This will revert the DXLink Fiber unit to DHCP mode. Start again at Step 1 above.*

* For additional information on establishing a Telnet connection and Telnet commands, see page 93.

# Technical Support

If this manual has not satisfactorily answered your questions regarding the DXLink Fiber Transmitters and Receivers or they are not operating as expected, please contact your AMX representative or technical support. Have the serial numbers for the units and the system's switcher ready. We recommend recording the serial numbers in an easily accessible location.

## AMX Contact Information


- 3000 Research Drive, Richardson, TX 75082
- 800.222.0193
- 469.624.8000
- Fax 469.624.7153
- Technical Support 800.932.6993
- www.amx.com

# Appendix A – Upgrading the Firmware

## Overview

The NetLinx Studio software application (available for free download from www.amx.com) provides the ability to transfer KIT files to NetLinx devices such as DXLink Fiber Transmitters and Receivers. The firmware on the Transmitters and Receiver can be upgraded in the field.

### Endpoint System (with a Switcher)

When a DXLink Fiber Transmitter and/or a Receiver are being used in conjunction with a switcher as an endpoint system, the switcher's integrated Master is used for the KIT file transfer. FIG. 26 shows a Transmitter and a Receiver bound to the integrated Master in an Enova DGX 32 in NetLinx Studio's OnLine Tree. Follow the instructions on the top of page 90 to prepare an endpoint system for KIT file transfer and the instructions on page 91 for the actual transfer.

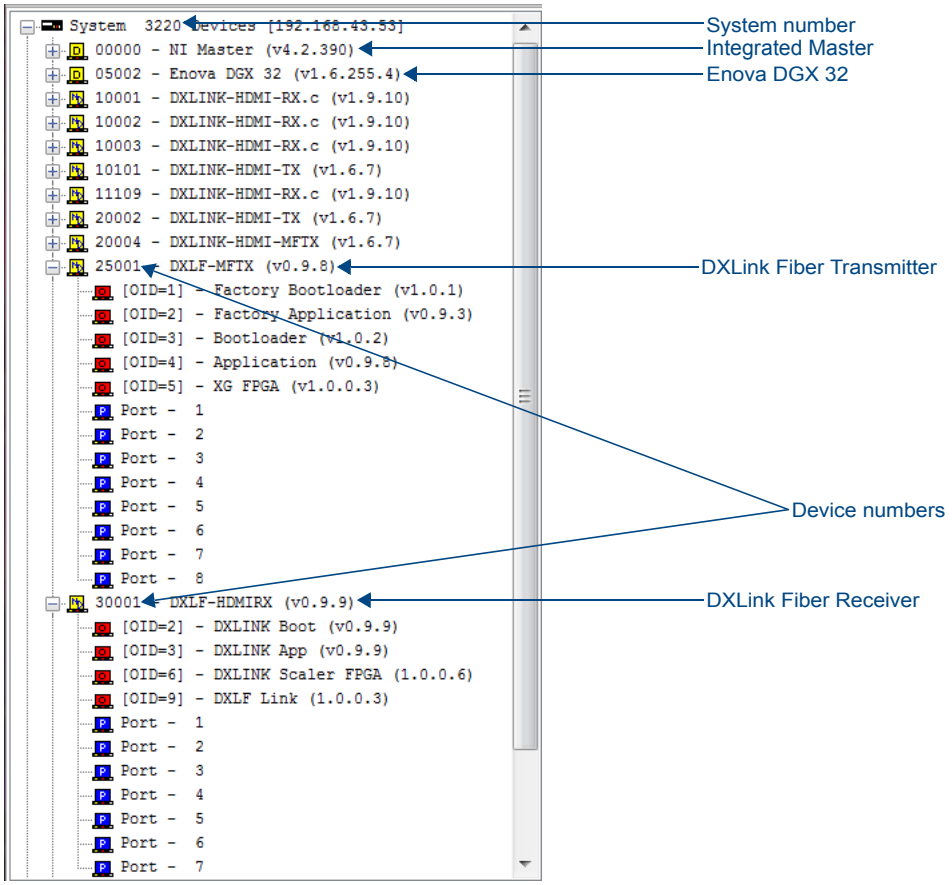



**FIG. 26** NetLinx Studio – Integrated Master, Enova DGX 32, and DXLink Fiber Transmitter and Receiver

# Preparing for KIT File Transfers in an Endpoint System

## To prepare for KIT file transfers in an endpoint system:

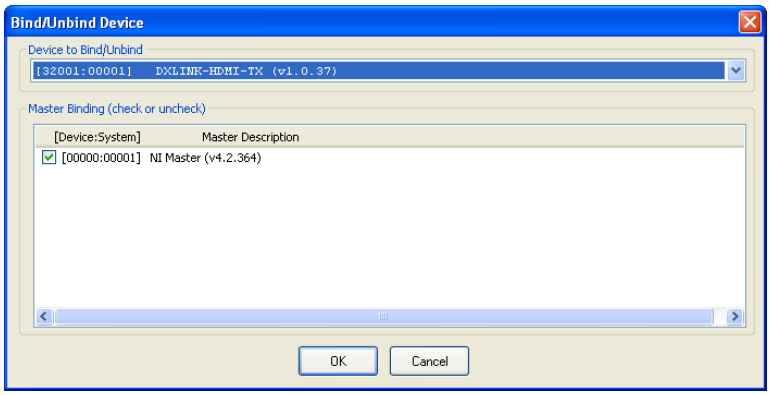
1. Verify that you have the latest version of NetLinx Studio on your PC.

   *If the version is not the latest –*

   - Use the Web Update option in NetLinx Studio's Help menu to obtain the latest version.

   **Or**

   - Go to www.amx.com and login as a Dealer to download the latest version.
2. Download the latest Firmware (KIT) file from www.amx.com on the DXLink Fiber Transmitter or Receiver product page to your PC. (Place KIT files on a local drive for speedy throughput.)
3. Verify the following:
   a. Verify that an Ethernet/RJ-45 cable is connected from the switcher's integrated Master to the network (e.g., from the LAN 100/1000 port on an Enova DGX 32 to a LAN).
   b. Verify that the target DXLink Fiber Transmitter or Receiver is connected via its fiber optic transceiver to a DXLink Fiber Input or Output Board (respectively) on the switcher.
   c. Verify that the switcher is powered on.
4. Launch NetLinx Studio and open the OnLine Tree.
5. Bind the target Transmitter or Receiver to the integrated Master: select and right-click the TX or RX; from the context sensitive menu, select Network Bind/Unbind Device (be sure the check box is selected); click OK.




6. Determine the Device Number assigned to the target Transmitter or Receiver when it was bound. For the Device Number location, see FIG. 26 on page 89. The Transmitter or Receiver is ready for the KIT file transfer.

# Important Upgrade Information

**Caution:** *Upgrading the firmware is a serious action in that if the upgrade fails, it can leave the system completely non-operational.*

## In the Event of Power Loss During an Upgrade

If power loss occurs *before* any firmware information has been transferred – when power is restored, the unit will remain operational using the original firmware.

If power loss occurs *after* some of the firmware information has been transferred *but before* the transfer is complete – when power is restored, the unit will time out and will not operate until a successful upgrade takes place.

**Caution:** *If the application signals a failure, you must immediately reboot the Transmitter or Receiver and attempt to upgrade the firmware again, as the unit is in an unknown state and cannot be guaranteed to be operational.*

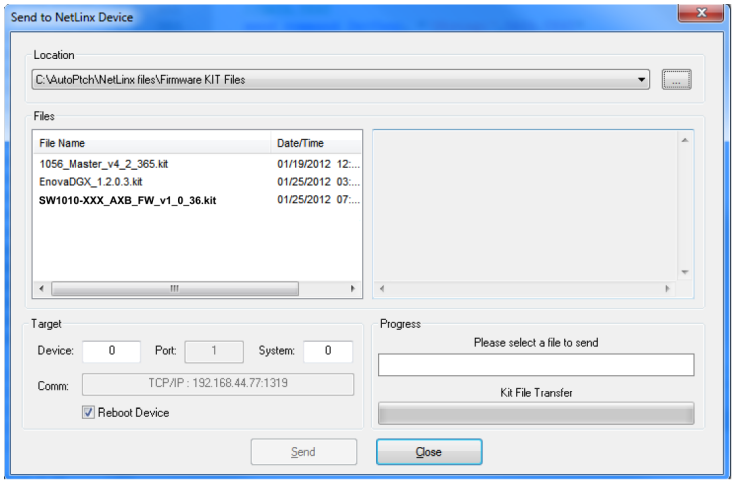
# Transferring KIT Files

The system will be non-operational during the upgrade procedure below.

The *Firmware Transfers* tool in NetLinx Studio is used to map KIT files to DXLink Fiber Transmitters and Receivers. The instructions below assume that the preparations on the previous page for an endpoint system have been completed.

## To send a KIT file to a DXLink Fiber Transmitter or Receiver:

1. In NetLinx Studio from the Tools menu, select "Firmware Transfers > Send to NetLinx Device" to open the Send to NetLinx Device dialog box.




2. Click Browse (...) to navigate to the target directory. The selected directory path is displayed in the Location text box. KIT files in the target directory display under Files.
3. Select the appropriate KIT file from the list.
4. Enter the Device and System numbers (see FIG. 26 on page 89) for the target unit in the Device and System text boxes.
5. Review the File, Connection, Address, and Target Device information for accuracy before you send.
6. Click Send to upgrade the firmware on the DXLink Fiber Transmitter or Receiver.
   The Power LED blinks during the process for upgrading the firmware (this is normal).
   The progress of the upgrade displays in the Upload Status field. Status is also indicated in the Status bar at the bottom. The success of the upgrade or any errors that occur will be reported.*

* If an incorrect file has been selected or if the upgrade has failed, the Power LED will briefly illuminate solid green then change to a slow blink. To recover (in either case), reboot the Transmitter or Receiver and browse to select the correct file and then re-send.

7. Close the window when the transfer is complete.
8. When the process is complete, cycle power using the new image on the DXLink Fiber unit (i.e., unplug the desktop power supply from the AC power source and plug it back in).
9. Wait 60 seconds and refresh the System OnLine Tree, and check to be sure the firmware version matches the version selected for the upgrade.

### *Reminder*

If you set the PC to Static IP Mode for a Virtual NetLinx Master file transfer – when the file transfer is complete, remember to return the setting to "Obtain an IP address automatically" (see page 111).

## Firmware Versions

The following table contains firmware version information for the DXLink Fiber units.

| DXLink Fiber Firmware Versions | | | |
|---|---|---|---|
| **Applies to** | **Version #** | **Date** | **Differences** |
| Multi-Format MMF-D TX<br>Multi-Format SMF-D TX | 1.0.3 | 2/27/14 | Baseline |
| HDMI MMF-D RX<br>HDMI SMF-D RX | 1.0.1 | 2/27/14 | Baseline |

# Appendix B – Telnet (Terminal) Commands

## Establishing a Terminal Connection Via Telnet

Telnet terminal communication is accessed remotely via TCP/IP. The DXLink Fiber Transmitter or Receiver *must* have its own TCP/IP address for a Telnet connection. The connection can be started from the Windows taskbar (see below) or in NetLinx Studio (see the following page).

By default, a username and password are not applied to the Telnet port (Port 23). Therefore, the port does not require login credentials. If you require a username and password for security purposes, directions for setting them are on page 95.

### *Welcome Banner with and without security enabled (Receiver shown):*

- Without Telnet security enabled, a session will begin with a welcome banner similar to the following:

```
Welcome to DXLF-HDMIRX v0.9.12 Copyright AMX LLC 2014
>
```

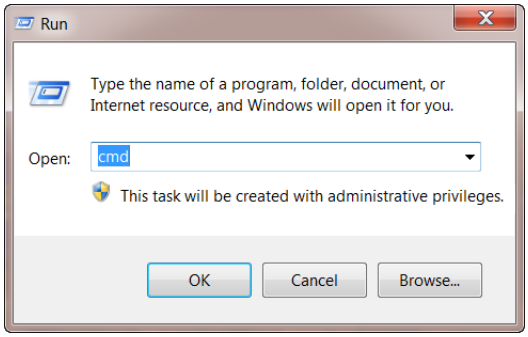
- If Telnet security is enabled, user credentials are required:

```
Enter username: admin
Enter protected password: ****
Welcome to DXLF-HDMIRX v0.9.12 Copyright AMX LLC 2014
>
```

**Note:** *When security is enabled, a user can retry logging in three times before being disconnected (for information on setting a username and password, see page 95).*

### To establish a terminal connection via Telnet at the CMD prompt:

1. From your Windows Taskbar (at far left), select Start > Run to open the Run dialog box.
2. Type `cmd` in the Open field.


Run
Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.
Open:
cmd
This task will be created with administrative privileges.
OK
Cancel
Browse...

3. Click OK to open an instance of the Windows command interpreter (cmd.exe).
4. At the prompt (**>**), type `telnet` followed by a space and the Transmitter or Receiver's IP address. Press Enter.
   Example:

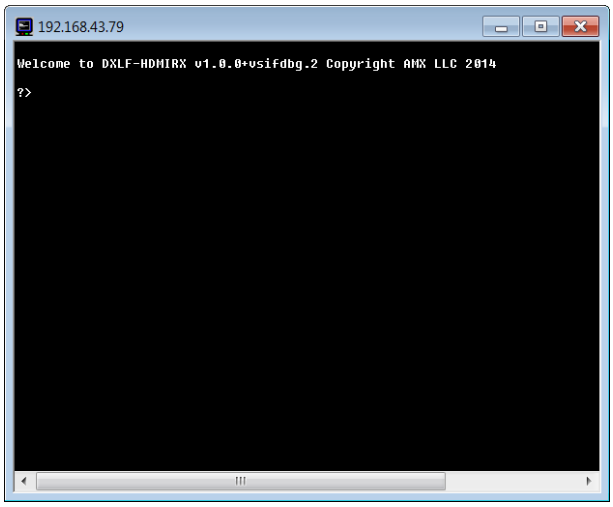
   ```
   >telnet XXX.XXX.XXX.XXX
   ```

   A Telnet session opens for the Transmitter or Receiver and the Welcome Banner appears.*
5. At the prompt, type the Telnet command (see the table starting on page 95) and press Enter.

* If you are using Windows 7 and receive an error message, you may need to enable Telnet by completing the following: (1) Go to Start / Control Panel / Programs and Features. (2) On the left, select "Turn Windows features on or off." (3) Select the check-boxes Telnet Client and Telnet Server. (4) Click OK.

### To establish a terminal connection via NetLinx Studio:

1. In the Online Tree, select the DXLink Fiber unit and right-click to access the shortcut menu.
2. Select Launch Telnet Window via NetLinx Studio.
   The Telnet window opens and the Welcome Banner appears (Receiver shown).




3. At the prompt (>), type the Telnet command and press Enter.

## Telnet Username and Password

The following commands are used to set the Telnet username and password for a Telnet connection:

- `Set Telnet Username`
- `Set Telnet Password`

By default, both the username and password are blank (empty strings). Performing a factory reset on the device with the ID Pushbutton will return these values to that default. For details, see page 59.

- `Username` – Setting the `Username` will have no effect if the password remains blank (empty string). Defining the username alone will not result in Telnet prompting for a user login.
- `Password` – Setting the `Password` will cause Telnet to prompt for a user login, whether the username has been defined or not. If the username has been defined, this value *must* be entered. However, since the password can be set independently of the username, it's possible to have a password defined, but the username still at its default (blank, empty string). In this case do not enter anything for the username when prompted. Simply press Enter, which will then present the password prompt. Here, the defined password *must* be entered in order to successfully open the Telnet session.

### Additional Notes

- Both the Telnet username and password are case-sensitive.
- Three consecutive, unsuccessful attempts to log in to Telnet will cause the Telnet window to close. Re-launching Telnet will again present the login prompt, with a fresh "batch" of login attempts.
- If a Telnet login fails because of an incorrect username, an "Invalid Password" message will appear (as opposed to an "Invalid Username" message).
- The username and password are saved after reboot or power cycle.
- The username and password are deleted/removed after a factory reset.

### Setting a Telnet Username and Password

### To set a Telnet username and password:

1. Establish a terminal connection via Telnet (see page 93).
2. Type `Set Telnet Username`, and press Enter.
   a. The program will prompt you to enter a new Telnet username; enter a username and press Enter.
   b. The program will indicate that the username is being stored.
3. Type `Set Telnet Password`, and press Enter.
   a. The program will prompt you to enter a password; press Enter twice to clear both the Telnet username and password.
   b. Enter a password and press Enter.
   c. The program will prompt you to re-enter the password; re-enter the password and press Enter.
   d. The program will indicate that the password is being stored.

## Telnet Commands

The Telnet commands listed in the table below can be sent directly to the Transmitter or Receiver via a Telnet terminal session.

- The default Telnet port is **23**. A value of **0** (zero) disables the Telnet server.*
- Telnet is enabled by default.

* If you set the Telnet port to "0" to disable it, you will need to perform a factory reset using the ID Pushbutton to re-enable it (see page 59).

In the terminal program, type `Help` or a question mark (`?`) and press Enter to access the Help Menu and display the terminal commands described in the table below (commands are listed alphabetically).

**Note:** *If you send a command to a Transmitter and the response is `Invalid command`, the command may only be valid on a Receiver (or vice versa).*

**Telnet Commands**

| Command | Description |
|---|---|
| **? or Help** | Display the commands listed in this table. |
| **ARP** | Displays the ARP (Address Resolution Protocol) table.<br>Example:<br>`>arp`<br>`IP Address  MAC Address  Info`<br>`192.168.43.51  00:1e:4f:a1:82:5d  C  Resend=0, Age=7529, Expire=7529`<br>`192.168.43.52  00:60:9f:94:94:1f  C  Resend=0, Age=41854, Expire=41854`<br>`192.168.43.57  00:60:9f:94:ad:8b  I--  Resend=0, Age=0, Expire=0`<br>`192.168.43.46  00:0a:cd:1b:6c:1d  C  Resend=0, Age=932900, Expire=130617` |

| Telnet Commands (continued) | |
|---|---|
| **audio**<br>**Note:** *This command must be entered in lower case only.* | **Note:** *This command applies only to the Receiver.*<br>Shows audio signal status.<br>Example:<br>`>audio`<br>`--------------------------------`<br>`Audio Output`<br>`============`<br>`Analog Audio ON`<br>`HDMI Audio ON`<br>`Audio Mute OFF`<br>`Audio Input`<br>`============`<br>`N Value`<br>`--------`<br>`0x00 0x17 0xFF`<br>`Channel Status Bits`<br>`-------------------`<br>`Audio Type: LPCM`<br>`Dolby TrueHD/DTS Master: No`<br>`Sampling Freq: 44.1kHz`<br>`Channel: 0`<br>`Raw Data:`<br>`0x00 0x00 0x00 0x30 0x73`<br>`Audio InfoFrames`<br>`-------------------`<br>`Channel: 2`<br>`Raw Data:`<br>`0x84 0x00 0x00 0x7C 0x01 0x00 0x00 0x00 0x00`<br>`0x00 0x00 0x00 0x00 0x00` |
| **avi**<br>**Note:** *This command must be entered in lower case only.* | **Note:** *This command applies only to the Receiver.*<br>Shows AVI InfoFrame status.<br>Example:<br>`>avi`<br>`--------------------------------`<br>`Decoder`<br>`AVI InfoFrame:`<br>`0x82 0x02 0x0D 0x65 0x00 0x08 0x00 0x02 0x00`<br>`0x00 0x00 0x00 0x00 0x00 0x00 0x00`<br>`Packet Type: 0x82`<br>`Version Type: 0x02`<br>`Length: 0x0D`<br>`Checksum: 0x65 (Valid)`<br>`Color Space: RGB`<br>`Colorimetry: No Data`<br>`VIC: 2`<br>`Pixel Repetition: 1x` |
| **CLEAR MASTER USERNAME** | Clears the Master username. |
| **CLEAR USB STATS** | **Note:** *This command applies only to the Transmitter.*<br>Clears the USB statistics. |
| **DATE** | Displays the current date. |

| Telnet Commands (continued) | |
|---|---|
| **DEVICE STATUS** | Displays device status of a specified device, port, system (<D:P:S>).<br>**Note:** *Devices other than the DXLink Fiber device itself will be ignored.*<br>Example:<br>`>device status 32002:1:0`<br>`Device Status`<br>`-------------`<br>`Device 32002 AMX LLC, DXLF-MFTX, 0.0.105.0 contains 8 Ports`<br>`Port 1 - Channels:255 Levels:8`<br>`MaxStringLen=64 Types=8 bit MaxCommandLen=64 Types=8 bit`<br>`The following input channels are on:None`<br>`The following output channels are on:None`<br>`Level 1=0 Supported data types=UByte,UInt`<br>`Level 2=0 Supported data types=UByte,UInt`<br>`Level 3=0 Supported data types=UByte,UInt`<br>`Level 4=0 Supported data types=UByte,UInt`<br>`Level 5=0 Supported data types=UByte,UInt`<br>`Level 6=0 Supported data types=UByte,UInt`<br>`Level 7=0 Supported data types=UByte,UInt`<br>`Level 8=0 Supported data types=UByte,UInt` |
| **DIPSWITCH** | Displays the current value for each of the DIP switch's four toggles.<br>Example:<br>`>dipswitch`<br>`Board Switch Settings:`<br>`ON : ICS LAN Enabled`<br>`OFF : Reserved`<br>`ON : Network Enabled`<br>`OFF : Reserved` |
| **DNS LIST** | Displays list of DNS settings.<br>Example:<br>`>dns list`<br>`DNS List`<br>`-------------`<br>`Domain suffix: amx.internal`<br>`The following DNS IPs are configured`<br>`Entry 1: 192.168.40.7`<br>`Entry 2: 192.168.40.8` |
| **ECHO** | **Note:** *This command applies only to the Transmitter.*<br>Toggles echo of local characters on and off. Enter "echo on" or "echo off" or simply re-enter "echo" to toggle between on and off. |
| **encoder**<br>**Note:** *This command must be entered in lower case only.* | **Note:** *This command applies only to the Receiver.*<br>Shows video encoder status.<br>Example:<br>`>encoder`<br>`--------------------------------`<br>`Video Encoder (ADV7511)`<br>`TMDS On`<br>`Mute Unmuted`<br>`HDCP Screen No` |
| **EXIT** | Closes the current Telnet session. |
| **FACTORY APP** | **Note:** *This command only applied to the Transmitter.*<br>Resets the application to the factory image.<br>**Note:** *This command does not reset the factory parameters.* |
| **FACTORYFWIMAGE** | Resets unit to factory firmware image and parameters and reboots the DXLink Fiber unit.<br>**Note:** *When a Transmitter is connected to a DXLink Fiber Input Board, the input board will override the "ALL RESOLUTIONS" EDID and load the last stored EDID.* |
| **FWIMAGES** | Displays firmware version information. |

| Telnet Commands (continued) | |
|---|---|
| **GET CONFIG** | Displays the current connection settings.<br>Example:<br>`>get config`<br>`Device number: 8010`<br>`Connection Settings`<br>`--------------------------------`<br>`Mode: NDP`<br>`System Number: 3155`<br>`Master IP/URL: 192.168.44.53`<br>`Master Port: 1319`<br>`Username:`<br>`Password:`<br><br>`IP Settings`<br>`--------------------------------`<br>`HostName: DXLF-TX`<br>`Type: DHCP`<br>`IP Address: 192.168.44.86`<br>`Subnet Mask: 255.255.255.0`<br>`Gateway IP: 192.168.44.2`<br>`MAC Address: 00:0f:3c:00:55:04`<br><br>`DHCP Server : 192.168.43.2`<br>`Lease Origin : THU 01/09/2031 12:59:02`<br>`Lease Duration : SUN 01/12/2031 12:59:02 (259200 sec)`<br>`Lease Renew (T1): SAT 01/11/2031 00:59:02 (129600 sec)`<br>`Lease Rebind (T2): SUN 01/12/2031 03:59:02 (226800 sec)`<br><br>`DNS Servers`<br>`--------------------------------`<br>`Domain suffix: amx.internal`<br>`Entry 1: 192.168.40.7`<br>`Entry 2: 192.168.40.8`<br>**Note:** *The system number and IP addressing information displayed is reflective of actual operating values, not stored parameters.* |
| **GET CONNECTION** | Shows the Master connection information.<br>Example:<br>`>get connection`<br>`Connection Settings`<br>`------------------------------`<br>`Mode: UDP URL`<br>`System Number: 1`<br>`Master IP/URL: 192.168.44.53`<br>`Master Port: 1319`<br>`Username:`<br>`Password:` |
| **GET DEVICE** | Displays the device number.<br>Example:<br>`>get device`<br>`Device Number`<br>`----------------------------------------`<br>`Stored Value: 0 (dynamic)`<br>`Active Value: 32005` |

| Telnet Commands (continued) | |
|---|---|
| **GET DNS** | Gets the list of DNS entries.<br>Example:<br>`>get dns`<br>`DNS Servers`<br>`------------------------------`<br>`Domain suffix: amx.internal`<br>`Entry 1: 192.168.40.7`<br>`Entry 2: 192.168.40.8`<br>**Note:** *When the DXLink Fiber unit is in DHCP Mode, these are active values, NOT the stored values that only apply to Static IP Mode.* |
| **GET ETHERNET MODE** | **Note:** *This command applies only to the Receiver.*<br>Displays the current LAN configuration setting.<br>Settings are ***either*** "auto" in which the LAN driver will discover its settings based on the network it is connected to ***or*** <speed> and <duplex> where speed is either 10 or 100 and duplex is either half or full (10 half, 10 full, 100 half, 100 full).<br>Example:<br>`>GET ETHERNET MODE`<br>`Ethernet mode is auto.`<br>**Note:** *See SET ETHERNET MODE on page 102.* |
| **GET FRIENDLY <name>** | Displays the device's friendly name (for NDP). |
| **GET IP** | Displays the IP configuration of a device.<br>The device displays its D:P:S, Host Name, Type (*DHCP* or *Static*), IP Address, Subnet Mask, Gateway IP, and MAC Address.<br>Example:<br>`>GET IP`<br>`HostName DXLF-TX`<br>`Type DHCP`<br>`IP Address 192.168.44.86`<br>`Subnet Mask 255.255.255.0`<br>`Gateway IP 192.168.44.2`<br>`MAC Address 00:0f:3c:00:55:04`<br>(*also displays "Lease" details; see example for GET CONFIG command*) |
| **GET LOCATION** | Displays the location parameter for NDP, which is set by using the *SET LOCATION* command (see page 103). |
| **GET PULSE TIME** | Displays the current pulse time in milliseconds.<br>Example:<br>`>get pulse time Pulse Time is now: 500` |
| **GET SN** | Returns the device's serial number. |
| **GET SYSTEM NUMBER** | Displays the stored system number.<br>Example:<br>`>get system number`<br>`System Number`<br>`----------`<br>`Stored Value: 0 (preferred for auto mode)`<br>`Active Value: 1 (connected NDP)` |

| Telnet Commands (continued) | |
|---|---|
| **GET USB** | **Note:** *This command applies only to the Transmitter.*<br>Displays USB statistics.<br>Example:<br>`>get usb`<br>`USB Statistics :`<br>`Number of USB Connections : 0`<br>`Number of Keyboard Messages : 0`<br>`Number of Mouse Messages : 0`<br>`Number of Table Messages : 0`<br>`Number of Connections : 0`<br>`Number of Disconnects : 1`<br>`Number of Errors : 0` |
| **IP STATUS** | Displays the IP status.<br>Example:<br>`>ip status`<br>`NetLinx IP Connections`<br>`Connected to 192.168.43.52, port 1319` |
| **LED [ON\|OFF]** | Enables/Disables LEDs for identification. |
| **NDP UNBIND** | Clears the NDP binding to a Master (takes effect after next boot). |
| **OFF** | Turns off the specified channel. |
| **ON** | Turns on the specified channel. |
| **PING [ADDRESS]** | Pings an address (IP or URL), to test network connectivity to and confirms the presence of another networked device.<br>The syntax matches the PING application in Windows or Linux.<br>Example:<br>`>ping 192.168.29.209`<br>`192.168.29.209 is alive.` |
| **PULSE** | Pulse specified [D:P:S], channel. |
| **REBOOT** | Reboots the DXLink Fiber unit.<br>Example:<br>`>REBOOT`<br>`Rebooting...` |
| **RENEW DHCP** | Renews / Releases the current DHCP lease for the DXLink Fiber unit.<br>**Note:** Because sending this command can result in the unit acquiring a new DHCP address and the functionality of the endpoints is dependent on the mated IP addresses of the TX (host) and RX (device), the USB connection may need to be reestablished. |
| **RESET FACTORY** | Resets the device's stored parameters to factory default state including removal of all security settings, resetting to DHCP. This command will cause an automatic reboot.<br>**Note:** *This command does not reset the device to the factory software image.*<br>**Note:** *When a Transmitter is connected to a DXLink Fiber Input Board, the input board will override the "ALL RESOLUTIONS" EDID and load the last stored EDID.* |

| Telnet Commands (continued) | |
|---|---|
| **scaler**<br>**Note:** *This command must be entered in lower case only.* | **Note:** *This command applies only to the Receiver.*<br>Shows video scaler status.<br>Example:<br>`>scaler`<br>`--------------------------------`<br>`Scaler Input`<br>`Width 1920`<br>`Height 1200`<br>`VFreq 60`<br>`VIC 0`<br>`ZoomW 1920`<br>`ZoomH 1200`<br>`Interlace 0`<br>`Scaler Output`<br>`Width 1280`<br>`Height 1024`<br>`VFreq 60`<br>`VIC 0`<br>`ARWidth 1280`<br>`ARHeight 800`<br>`Interlace 0`<br>`scalarMux 1`<br>`aspectRatio 0`<br>`pixelRep 1`<br>`imageFreeze 0`<br>`testPattern 0`<br>`DnSclHeight 800`<br>`DnSclWidth 1280`<br>`UpSclHeight 800`<br>`UpSclWidth 1280`<br>`VClipOffset 0`<br>`ClipHeight 1200`<br>`ClipTopOff 0`<br>`VClipOffset 0`<br>`ClipWidth 1920`<br>`ClipLeftOff 0` |
| **SEND_COMMAND [D:P:S,"'command'"]** | Sends the specified SEND_COMMAND (does not work with queries) to the current DXLink Transmitter or Receiver.<br>**Note: *P*** *(Port) number must be 1;* **S** *(System) number must be 0 (zero).*<br>**Note:** *Commands cannot be forwarded to other D:P:S. Asynchronous notifications are available for the Transmitters via Telnet (and NetLinx Studio).*<br>Example:<br>`send_command 6501:1:0,"'VIDIN_AUTO_SELECT-ENABLE'"` |
| **SEND_STRING [D:P:S,"'string'"]** | Sends the specified SEND_STRING to the current DXLink Transmitter or Receiver or connected Master.<br>**Note: *P*** *(Port) number must be 1;* **S** *(System) number must be 0 (zero).*<br>**Note:** *Commands cannot be forwarded to other D:P:S. Asynchronous notifications are available for the Transmitters via Telnet (and NetLinx Studio).*<br>Example:<br>`send_string 32001:1:1,"27,18,0"` |
| **SET CONNECTION** | Sets the Master connection settings interactively, allowing the user to specify the mode (for descriptions of various connection modes, see page 108).<br>• If the mode is TCP or UDP, the Master URL and port number can be specified as well.<br>• If Auto is selected, the System number can be specified.<br>• After all data is entered, if the parameters have changed, the DXLink Fiber unit will disconnect from the Master, and begin trying to connect with the new settings.<br>**Note:** *These changes do not require a reboot to take effect.* |

| Telnet Commands (continued) | |
|---|---|
| **SET DEVICE** | Sets the device number, and stores it in non-volatile memory.<br>Syntax:<br>`SET DEVICE <num>`<br>The valid range of device numbers is 0 to 31999.<br>• If the user enters a number outside that range, then no change will be made and the DXLink Fiber unit will issue an error message.<br>• A Device Number of '0' means that the DXLink Fiber unit will accept the auto-assigned device number from the Master.<br>• If the new device number is different from the old device number, the DXLink Fiber unit will disconnect from the Master, and begin trying to connect with the new settings.<br>**Note:** *These changes do not require a reboot to take effect.* |
| **SET DNS** | Sets the DNS configuration of the DXLink Fiber unit, only as applied to Static IP Mode (DNS settings in DHCP Mode are received from the DHCP server).<br>Syntax:<br>`SET DNS`<br>This command prompts you to enter a Domain Name, DNS IP #1, DNS IP #2, and DNS IP #3.<br>• Enter Y (yes) to approve/store the information in the Master.<br>• Enter N (no) cancels the operation.<br>**Note:** *The device must be rebooted to enable new settings.*<br>Example:<br>`>SET DNS`<br>`-- Enter New Values or just hit Enter to keep current settings --`<br>`Enter Domain Suffix: amx.com`<br>`Enter DNS Entry 1 : 192.168.20.5`<br>`Enter DNS Entry 2 : 12.18.110.8`<br>`Enter DNS Entry 3 : 12.18.110.7`<br>`You have entered: Domain Name: amx.com`<br>`DNS Entry 1: 192.168.20.5`<br>`DNS Entry 2: 12.18.110.8`<br>`DNS Entry 3: 12.18.110.7`<br>`Is this correct? Type Y or N and Enter -> Y`<br>`Settings written. Device must be rebooted to enable new settings` |
| **SET ETHERNET MODE** | **Note:** *This command applies only to the Receiver.*<br>This command sets the current LAN configuration settings per new mode.<br>Syntax:<br>`SET ETHERNET MODE <m>`<br>Values for *<m> (mode)* are:<br>`auto, 100 full, 100 half, 10 full, 10 half`<br>**Note:** *This command requires a reboot to enable new settings.*<br>Examples:<br>`set ethernet mode auto`<br>`set ethernet mode 100 full`<br>**Note:** *See GET ETHERNET MODE on page 99.* |
| **SET FRIENDLY** | Set the device's friendly name for NDP to <name>.<br>Syntax:<br>`SET FRIENDLY <name>`<br>• Maximum length = 25 characters. If the name entered exceeds 25 characters, it will be truncated.<br>• The value is stored in non-volatile memory.<br>• If no value specified, an automatic name consisting of AMX, the product name, and serial number will be used.<br>**Note:** *This command requires a reboot to enable new settings.* |

| Telnet Commands (continued) | |
|---|---|
| **SET IP** | Sets the IP configuration of a specified device.<br>Enter a Host Name, Type (*DHCP* or *Fixed*), IP Address, Subnet Mask, and Gateway IP Address.<br>**Note:** *DHCP implies "DHCP with link-local fallback".*<br>**Note:** *For NetLinx Masters, the Host Name can only consist of alphanumeric characters.*<br>• Enter Y (yes) to approve/store the information into the Master.<br>• Enter N (no) to cancel the operation.<br>**Note:** *This command requires a reboot to enable new settings.*<br>Example:<br>`>SET IP`<br>`--- Enter New Values or just hit Enter to keep current settings ---`<br>`Enter Host Name: MLK_INSTRUCTOR`<br>`Enter IP type. Type D for DHCP or S for Static IP and then Enter: DHCP`<br>`You have entered: Host Name MLK_INSTRUCTOR`<br>`Type DHCP`<br>`Is this correct? Type Y or N and Enter -> y`<br>`Settings written. Device must be rebooted to enable new settings.`<br>**Note:** *DXLink Fiber units can also be set to Static IP or DHCP Mode via the front panel ID Pushbutton.* |
| **SET LOCATION** | Sets the location parameter for NDP.<br>Syntax:<br>`SET LOCATION <location>`<br>• Maximum length = 25 characters. If the name entered exceeds 25 characters, it will be truncated.<br>**Note:** *This command requires a reboot to enable new settings.* |
| **SET MASTER PASSWORD** | Sets the password for the Master. |
| **SET MASTER USERNAME** | Sets the username for the Master. |
| **SET PULSE TIME** | Sets the pulse time.<br>• Value range for pulse time = 10 to 5000 milliseconds. |
| **SET SYSTEM NUMBER** | Sets the stored system number. |
| **SET TELNET LOGIN** | **Note:** *This command applies only to the Transmitter.*<br>Sets the Telnet username and password. |
| **SET TELNET PORT** | Sets the device's IP port listened to for Telnet connections.<br>Example:<br>`>SET TELNET PORT`<br>`Current telnet port number = 23`<br>`Enter new telnet port number (Usually 23)(0 = disable Telnet):`<br>Once you enter a value and press the Enter key, you get the following message:<br>`Setting telnet port number to 23`<br>`New telnet port number set, reboot the device for the change to take effect.`<br>**Note:** *This command requires a reboot to enable new settings.*<br>**Important:** *If you set the Telnet port to "0" to disable it, you will need to perform a factory reset using the ID Pushbutton to re-enable it (see page 59).* |
| **SET TELNET USERNAME** | **Note:** *This command is supported but is not presently in the Help file list of commands.*<br>Sets the username for a secure Telnet session.<br>• Default = blank (no username required)<br>• For details, see page 94 |

| Telnet Commands (continued) | |
|---|---|
| **SET TELNET PASSWORD** | **Note:** *This command is supported but is not presently in the Help file list of commands.*<br>Sets the username for a secure Telnet session.<br>• Default = blank (no password required)<br>• For details, see page 94 |
| **SHOW ANALOG STATS** | **Note:** *This command applies only to the Transmitter.*<br>Displays information about the analog signal.<br>Example:<br>`>show analog stats`<br>`Detected Timing: 1920x1080p @ 60.0 Hz`<br>`Format: VGA`<br>`Scan Type: PROGRESSIVE`<br>`Sync Type: SEPARATE`<br>`H Sync Active: YES`<br>`V Sync Active: YES`<br>`H Sync Polarity: POSITIVE`<br>`V Sync Polarity: POSITIVE`<br>`Block Length: 3191`<br>`Field Length: 1757`<br>`Lines/Vsync: 5`<br>`Lines/Field: 1125` |
| **SHOW CONNECTION STATS** | Shows the connection statistics for the device.<br>Output similar to the following example:<br>`>show connection stats`<br>`Connection Statistics`<br>`Total Last 15 Minutes`<br>`===== ===============`<br>`ICSP Messages: 10039 received 333 received`<br>`10038 transmitted 333 transmitted`<br>`Blink Messages: 5014 received 166 received`<br><br>`IP Statistics:`<br>`RX packets:29298 errors:0 discarded:0`<br>`TX packets:15286 errors:0 discarded:0` |
| **SHOW DECODER DUMPS** | **Note:** *This command applies only to the Transmitter.*<br>Displays decoder register information.<br>Example (partial due to length of decoder dump):<br>`>show decoder dumps`<br>`ADV7623 IO Registers (8-bit address 0xb2):`<br>`00 01 02 03 04 05 06 07 : 08 09 0a 0b 0c 0d 0e 0f`<br>`----------------------------------------------------------------`<br>`00 -0a 05 f2 00 62 2c a0 40 : 14 00 90 44 42 1e 0f 1e`<br>`10 -00 00 c9 0d 6a a0 43 5a : 34 00 02 00 00 00 00 20`<br>`20 -ff 00 00 03 00 00 00 00 : 00 00 00 00 00 00 00 00`<br>`30 -88 00 00 00 00 00 00 00 : 00 00 00 00 00 00 00 00`<br>`40 -20 30 14 00 00 00 10 00 : 00 00 00 00 00 00 00 00`<br>`50 -00 00 00 00 00 00 00 00 : 00 00 00 0a 00 00 00 0c`<br>`60 -03 00 00 00 fd 4c 00 00 : 00 f9 44 00 00 00 ff 07` |
| **SHOW DECODER STATS** | **Note:** *This command applies only to the Transmitter.*<br>Displays decoder information. |

| Telnet Commands (continued) | |
|---|---|
| **SHOW DIGITAL STATS** | **Note:** *This command applies only to the Transmitter.*<br>Displays information about the digital signal.<br>Example:<br>`>show digital stats`<br>`Transmitter Video Signal`<br>`Video mode: HDMI`<br>`Upstream video is not freerun.`<br>`Is not 3D`<br>`1920 x 1200 5994 (Hz*100)`<br>`PClk: 15399 (MHz/10000) HFreq: 7403 (Hz*100), VIC: 0`<br>`HBlank: 48+33+79=160  HTotal: 2080`<br>`VBlank: 6+12+52=35  VTotal: 1235`<br>`Interlaced: False`<br>`Replication Factor: 1`<br>`Deep Color: 8 bits`<br>`Color Space: RGB 444`<br>`Video is not encrypted.` |
| **SHOW DNS** | Shows the DNS settings.<br>Example:<br>`>show dns`<br>`DNS Servers`<br>`----------`<br>`Domain suffix: amx.internal`<br>`Entry 1: 192.168.40.7`<br>`Entry 2: 192.168.40.8` |
| **SHOW LOG** | Displays the message log.<br>Syntax:<br>`SHOW LOG <start>`<br>• Use <start> to specify the message number to start displaying.<br>• Use <all> to display all messages. |
| **SHOW MASTER CONNECTION URL** | Shows Master connection information.<br>Example:<br>`>show master connection url`<br>`Master Connection URL`<br>`----------`<br>`Master IP/URL: 192.168.1.91`<br>`Master Port: 1319` |
| **SHOW NDP INFO** | Displays NDP information.<br>Example:<br>`>show ndp info`<br>`Stored Parameters:`<br>`Master Connection Mode : NDP`<br>`MAC Address for bound Master : 00:60:9f:94:94:1f`<br><br>`Current Parameters:`<br>`Current NDP state is : NdpFound`<br>`Number of announcements : 2`<br>`Current Master IP Address : 192.168.43.52` |
| **SHOW ROUTE** | Shows all active network routes the device detects.<br>Example:<br>`>show route`<br>`Active Routes`<br>`----------`<br>`Network Netmask Gateway`<br>`0.0.0.0 0.0.0.0 192.168.43.2`<br>`127.0.0.0 255.0.0.0 127.0.0.1`<br>`192.168.43.0 255.255.255.0 127.0.0.1` |

| Telnet Commands (continued) | |
|---|---|
| **SHOW TCP** | Shows the TCP list.<br>Example:<br>`>show tcp Show TCP List`<br>`------------`<br>`The following TCP connections exist(ed):`<br>`1: 192.168.43.57:23 <=> 192.168.43.51:51418 (connected)`<br>`2: Port:24 (listening)`<br>`3: Port:23 (listening)`<br>`4: Port:7 (listening)` |
| **SHOW UDP** | Shows the UDP list.<br>Example:<br>`>show udp Show UDP List`<br>`------------`<br>`The following UDP ports are listening:`<br>`1: Port:1319`<br>`2: Port:68 (DHCP client)`<br>`3: Port:7`<br>`4: Port:2222`<br>`5: Port:4998` |
| **SHOW XG STATS** | **Note:** *This command applies only to the Transmitter.*<br>Displays information about the XG connection.<br>Example (partial due to length of stats):<br>`>show xg stats`<br>`**********XG Block Information**********`<br>`I2C 8-bit Address: 0x52`<br>`I2C 7-bit Address: 0x29`<br><br>`FW Version: 1.0.0.4`<br>`FW ID: 0x20A0`<br>`HW ID: 0x0000`<br>`Interface Version: 0x20`<br>`FPGA Version: 0x13`<br>`Build Date/Time: Feb 22 2014/13:56:06` |
| **TAIL** | **Note:** *Direct use of this command applies only to the Transmitter. Using the TAIL command for the Receiver requires superuser remote bug access.*<br>Outputs the device log. |
| **TIME** | Displays the current time. |
| **VERSION** | Displays the version information for the DXLink Fiber device.<br>Example:<br>`>version`<br>`Device: DXLF-MFTX`<br>`Serial: 1010560012345678`<br>`MAC Addr : 00:60:9f:94:ad:d3`<br>`Hardware : 0.1`<br>`DXLF Boot: v1.0.4`<br>`DXLF App : v1.0.0`<br>`DXLF Link: v1.0.0.7` |

| Telnet Commands (continued) | |
|---|---|
| **video**<br>**Note:** *This command must be entered in lower case only.* | **Note:** *This command applies only to the Receiver.*<br>Shows video signal status.<br>Example:<br>`>video`<br>`--------------------------------`<br>`Input Video Signal`<br>`==================`<br>`Input Video`<br>`-----------`<br>`Video Signal Valid`<br>`FreeRun VSIF Not Set`<br>`Video Type HDMI`<br>`Width 1920`<br>`Height 1200`<br>`Refresh Rate 60Hz`<br>`Scan Type Progressive`<br>`Encrypted Video Disabled`<br>`InfoFrames`<br>`----------`<br>`Aspect Ratio No Data`<br>`Color Space RGB`<br>`Pixel Rep 1x`<br>`VIC 2`<br>`Deep Color 8-bit`<br>`Output Video Signal`<br>`====================`<br>`Output Video`<br>`------------`<br>`ScalarMux Manual`<br>`Width 1280`<br>`Height 1024`<br>`VFreq 60Hz`<br>`VIC 0`<br>`TMDS On` |
| **vsif**<br>**Note:** *This command must be entered in lower case only.* | **Note:** *This command applies only to the Receiver.*<br>Shows video VSIF information.<br>Example:<br>`>vsif`<br>`--------------------------------`<br>`Decoder`<br>`Vendor Specific InfoFrame:`<br>`0x81 0x01 0x1C 0x47 0xD0 0x00 0x01 0x02 0x01`<br>`0x00 0x01 0x00 0x00 0x03 0x00 0x00 0x00`<br>`0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00`<br>`0x00 0x00 0x00 0x00 0x00 0xBD`<br><br>`Packet Type: 0x81`<br>`Version Type: 0x01`<br>`Length: 0x1C`<br>`Checksum: 0xBD (Valid)`<br>`Audio Injected: No`<br>`3d Video: No`<br>`Encryption Status: Not Encrypted`<br>`Free Run: Not Set`<br>`Video Stream: HDMI` |

| Telnet Commands (continued) | |
|---|---|
| **xg**<br>**Note:** *This command must be entered in lower case only.* | **Note:** *This command applies only to the Receiver.*<br>Displays information about the XG fiber link status control.<br>Usage:<br>`xg info` Shows XG block information<br>`xg stats` Shows XG block statistics<br>`xg stats on 5000` Enables periodic logging of stats every 5 seconds (view with the 'tail' command)<br>`xg stats off` Disables periodic logging of stats<br>`xg shortstats` Shows XG brief statistics<br>`xg dump` Shows hex dump of XG block registers |
| **xg stats**<br>**Note:** *This command must be entered in lower case only.* | **Note:** *This command applies only to the Receiver.*<br>Shows the XG block statistics. |

## Master Connection Modes

The mode of communication used for connection to the Master is specified via the `SET CONNECTION` Telnet command (see page 101).

The connection mode setting options are AUTO, TCP URL, UDP URL, or NDP (default) as described below.

- **AUTO** – This mode utilizes TCP communication. It looks for a matching System Number and attempts to come online with the first Master it sees with that System Number.
- **TCP URL** – TCP; the Master is specified via URL.
- **UDP URL** – UDP; the Master is specified via URL.
- **NDP** – UDP; this mode utilizes the NDP binding process to assign the DXLink Fiber unit (the physical device) to a Master (or Virtual Master) via NetLinx Studio. Once bound, communications are conducted via UDP.

**Note:** *In URL modes, the Master can use either an IP address or a DNS name.*

### Guidelines

**UDP mode** is recommended for the following types of installations:

- Small-to-medium residential and corporate installations on a single subnet
- Segmented control network installations (control network is a separate switching domain and subnet from other network equipment)
- Installations with the total of NetLinx / ICSNET devices on a single Master exceeding 128

**TCP mode** is recommended for installations where (a) the switching domain of the network is subject to **"**bursty**"** traffic or heavy streaming activity (>20 Mbps consumption by streaming) **and** where (b) the total number of NetLinx / ICSNET devices on a single Master is less than 128.

### TCP vs. UDP

- **TCP** – Protocol has a built-in retry mechanism.
- **UDP** – Protocol does not have a built-in retry mechanism, but consumes fewer resources on the Master. AMX's UDP implementation of NetLinx employs a retry mechanism to provide the reliability of TCP with the resource efficiency of UDP.

### URL vs. NDP vs. Auto

Determining which connection method to use for Master Connection Mode is essentially a matter of deciding what information the device should use to identify the correct Master to connect to.

The default mode is NDP; the mode can be changed via the `SET CONNECTION` Telnet command (see page 101).

- **URL** – The device connects to the Master with the specified URL. The device must be configured with the URL of a specific Master via the `SET CONNECTION` Telnet command (see page 101).
- **NDP** – The device connects to the Master it's been bound to, which is based on the Master's MAC address. The binding is configured via NetLinx Studio. Once bound, the device must be unbound using either NetLinx Studio or the `NDP UNBIND` Telnet command before being re-bound to a different Master.
  Alternatively, NDP devices can be bound/unbound via options on the Master's Web Configuration pages (System > Manage NetLinx). For details, refer to the *NetLinx Integrated Controllers - WebConsole & Programming Guide* (see section on "System - Manage NetLinx").
- **Auto** – The device connects to the first Master it finds with the specified System Number.
  The device must be configured with the desired system number via the `SET CONNECTION` Telnet command (see page 101).
  Use of this method requires that only one Master has any particular system number and is visible to the subnet. If this is the case, then Auto is the simplest choice. However, with Auto, you are not hard-bound to a particular Master. Therefore, if at some point in the future, another Master is configured with the same system number, the result is that the DXLink Fiber unit could show up on that other Master.

## Notes on Specific Telnet Clients

Telnet and terminal clients exhibit different behaviors in some situations. This section states some of the known anomalies.

### Windows Client Programs

Anomalies occur when using a Windows® client if you are not typing standard ASCII characters (i.e., using the keypad and the Alt key to enter decimal codes). Most programs will allow you to enter specific decimal codes by holding Alt and using keypad numbers.

#### *Example*

For example, hold Alt, hit the keypad 1, then hit keypad 0, then release Alt. The standard line feed code is entered (decimal 10). Windows will perform an ANSI to OEM conversion on some codes entered this way because of the way Windows handles languages and code pages.

The following codes are known to be altered, but others may be affected depending on the computer's setup.

- Characters **15**, **21**, **22**, and **any characters above 127**.

This affects both Windows Telnet and terminal emulation programs.

### Linux Telnet Client

The Linux Telnet client has three anomalies that are known at this time:

- A null (\00) character is sent after a carriage return.
- If an "Alt 255" is entered, two of the "255" characters are sent (per the Telnet RAFT).
- If the code to return to Command mode is entered (Alt 29 which is ^]), the character is not sent, but the Telnet Command Mode is entered.

# Appendix C – Virtual NetLinx Master

## Overview Virtual NetLinx Master (Masterless)

A Virtual NetLinx Master can be created using your PC, which allows NetLinx Studio to facilitate direct file transfers to a DXLink Fiber Transmitter or Receiver when a Master is not available.

Four basic procedures must be completed for Virtual Master file transfers:

- Set the PC to a static IP address (below).
- Create a Virtual Master in NetLinx Studio (page 112).
- Prepare the DXLink Fiber Transmitter or Receiver by placing it in Static IP Mode, assigning a device ID, and setting the connection type to TCP (page 114).
- Transfer the files using a Virtual Master TCP/IP connection (for IRL file transfers, see page 61; for Firmware file transfers, see page 89).

## Setting PC to Static IP Address

**Important:** *When you change the PC's settings to a static IP address, the address must be in the same subnet as the DXLink Fiber unit (the default static IP address for DXLink Fiber Transmitters and Receivers is 192.168.1.2).*

### *Important Information for PCs with Multiple Network Access Points*

If the PC has more than one point of network access (multiple NIC cards or wireless networking), check to see if one of the connections uses an IP address of 192.168.1.x before proceeding.

#### To check for multiple networks:

1. Open the PC's Start menu (at the lower left of the desktop on the Taskbar) and select Run.
2. Enter `cmd` and click OK.
3. At the prompt, enter `ipconfig /all` and press the Enter key.
4. Check the IP Addresses under Connection.

If the PC or Laptop is currently using a connection with an IP address of 192.168.1.x, you will need to disconnect the connection.

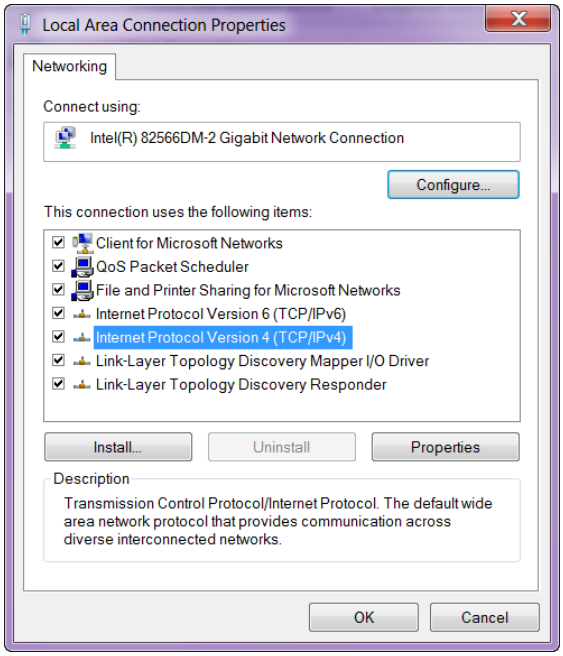
#### To disconnect a network connection:

1. **Modem:** From the Start menu on the desktop task bar, select Settings \ Network Connections.
   **Wireless:** From the Start menu on the desktop task bar, select Control Panel \ Network and Internet \ Manage Wireless Networks.
2. Right-click the network connection and select Disable.

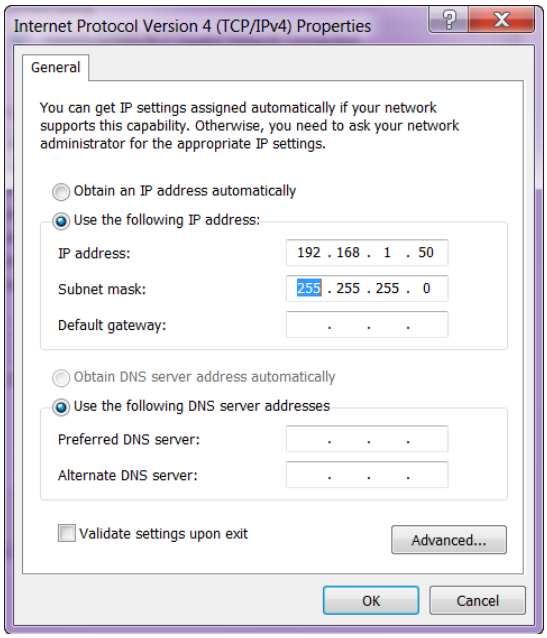
**Note:** *The following procedure was completed on Windows 7 Professional (other versions may vary slightly).*

## To set a PC to Static IP Mode:

1. From the Start menu on the desktop taskbar, select Control Panel / Network and Sharing Center.
2. Click "Change adapter settings" (top left).
3. Right-click on Local Area Connection and select Properties.
   The Local Area Connection Properties dialog box opens.




4. From the list of "This connection uses the following items" (see above), highlight Internet Protocol Version 4 (TCP/IPv4) and click Properties.
   The Internet Protocol Version 4 (TCP/IPv4) Properties dialog box opens.


Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 1 . 50
Subnet mask: 255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

5. Select "Use the following IP address" and enter 192.168.1.50 (or the IP range of the Enova DGX).

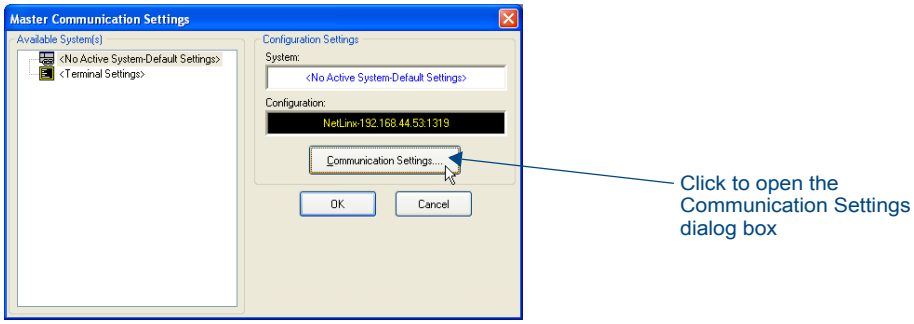
6. Press the Tab key on your keyboard to auto-fill the Subnet mask field.
7. Click OK and click Close.

**Important:** *When finished using the PC as a Virtual Master, change the setting in the dialog box shown in Step 4 back to "Obtain an IP address automatically."*

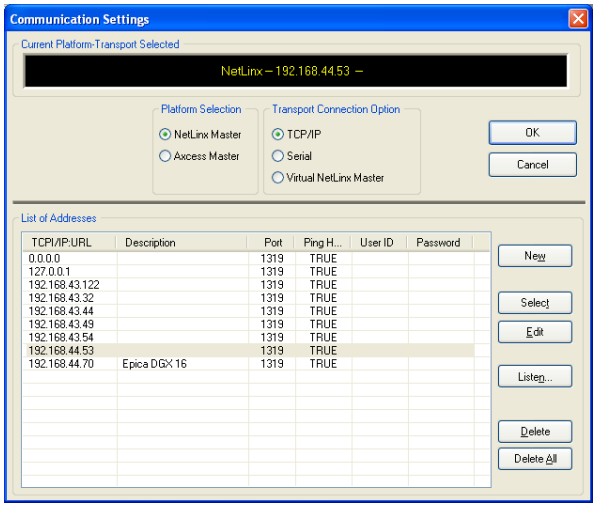
## Creating a Virtual Master

### To create a Virtual Master in NetLinx Studio:

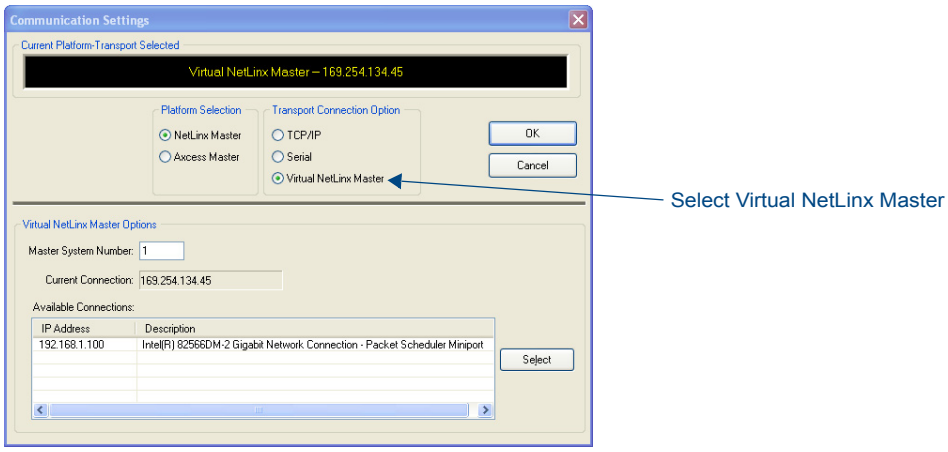
1. Open NetLinx Studio.
2. From the Settings menu, select Master Communication Settings.



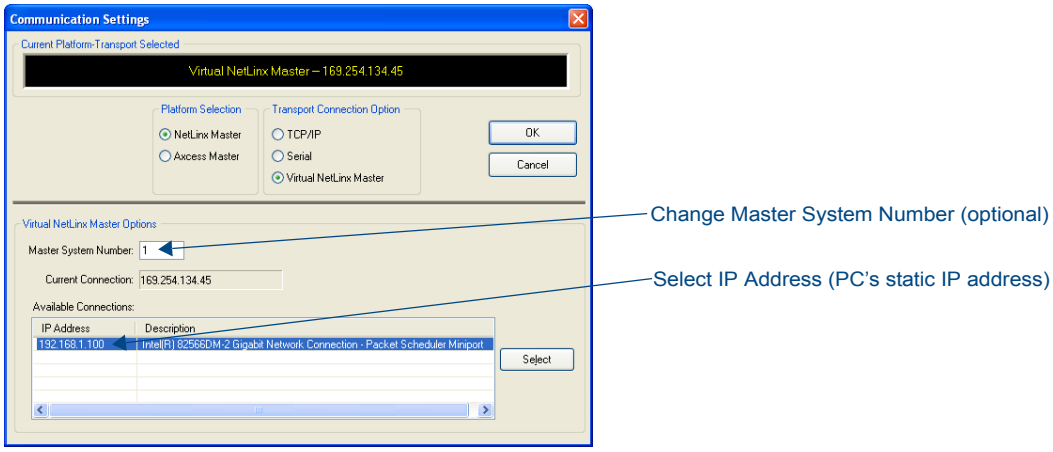

3. Click Communication Settings on the right.
   The Communication Settings dialog box opens.



4. Under Transport Connection Option, select Virtual NetLinx Master.




5. Under Virtual NetLinx Master Options:
   a. Optional – Change the Master System Number (default = 1; range = 1 to 65535).
   b. Select the desired IP Address in the Available Connections list (this will be the static IP address that the PC was set to in the previous instructions).




6. Click Select.
7. Click OK to save the changes and close the dialog box.
   The Virtual Master displays in the NetLinx Studio's OnLine Tree.

**Important:** *When transferring files via a Virtual Master, a direct connection must be made between the DXLink Fiber unit and the PC via the unit's ICS LAN 10/100 port.*

# Preparing a TX/RX to Work with a Virtual Master

Preparing the DXLink Fiber Transmitter or Receiver to work with a Virtual Master requires placing the unit in Static IP Mode, assigning it a device ID, and setting the connection type to TCP.

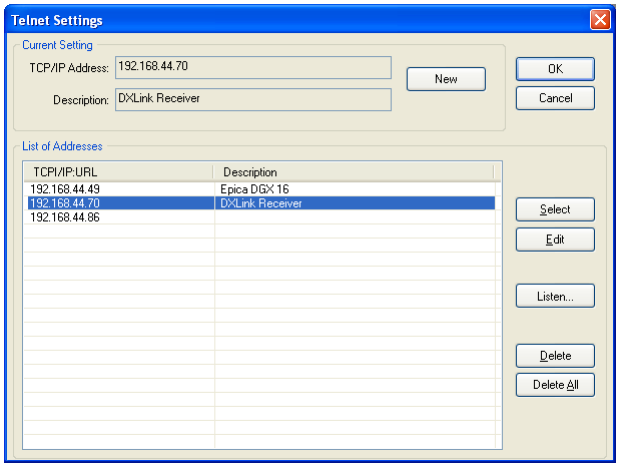
**Note:** *When using the first set of instructions below, only one DXLink Fiber TX/RX can be connected to the Virtual Master at a time because the static IP address is the same for all DXLink Fiber units.*

## To place a DXLink Fiber unit in Static IP Mode:

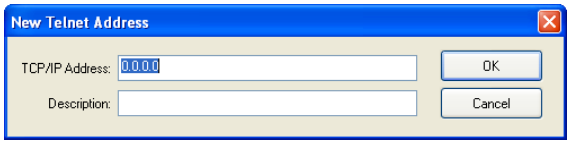
1. Connect the DXLink Fiber unit via its ICS LAN 10/100 port to the PC acting as a Virtual Master.
2. Set the DIP Switch's #1 and #3 Toggles to ON.
3. Apply power to the DXLink Fiber unit.
4. Once the DXLink Fiber unit has booted up (the Power LED on the front of the unit turns a constant green, indicating a ready state), press and hold the ID Pushbutton for at least 10 seconds.
5. The NetLinx LEDs toggle back and forth during this time and then blink faster in unison; release when the faster blink starts.
   - When the ID Pushbutton is released, the DXLink Fiber unit toggles either from static to dynamic (DHCP) IP addressing or vice versa and remains in that mode until the ID Pushbutton is used to set it again.
   - The DXLink Fiber unit automatically reboots to complete the process.

## To assign a device ID and set the connection type:

1. From the Tools menu in NetLinx Studio, select Telnet Session.
   The Telnet Settings dialog box opens.




2. Click the New button.
   The New Telnet Address dialog box opens.




3. Enter the default static IP address for the unit: 192.168.1.2 and click OK.
4. Select the new address in the List of Addresses.
5. Click the Select button and click OK.
6. A Telnet session opens.

7. At the prompt (**>**), type `SET DEVICE <num>` and press Enter.
   - For the `<num>` value, the valid range of device numbers is 0 to 31999.
   - Setting a device number does not require a reboot to take effect.
8. At the prompt, type `SET CONNECTION` and press Enter.
9. Specify TCP for the connection and the PC's static IP address for the Master.
   The Transmitter or Receiver displays under the Virtual Master and is now ready for file transfers.

**Note:** *The process can be repeated for additional Transmitters and Receivers.*

### *File transfers via a Virtual Master:*

- IRL file transfers, see page 61
- Firmware file transfers, see page 89

**Important:** *Once you have finished using the Virtual Master – if you disabled a network connection before setting the PC's static IP address, be sure to disable the Virtual Master's network connection and enable the original connection.*

# Appendix D – Cable Details and Pinout Info

## Overview

The DXLink Fiber Transmitters and Receivers each have an HDMI connector. The Transmitters also have an HDMI output connector on the front for sending the video signal directly from the source to a local destination device. This connection supports the same input resolutions contained in the first table in "Appendix E - Supported Input Resolutions" (see page 119).

**Important:** *System configurations will vary, necessitating different cable requirements for each system. Cables not available through AMX should come from a trusted cable supplier.*

**Note:** *When cabling video through either the HDMI port or HD-15 port, installers should be aware of how cabling will affect audio signals. For information on audio precedence, see "Audio Type Precedence" on page 42.*

## HDMI Connector Cable Pinout

HDMI connectors are found on all DXLink Fiber units. These connectors are used to pass HDMI or DVI-D signals (using a DVI-to-HDMI cable) from a source device to a DXLink Fiber Transmitter or from a DXLink Fiber Receiver to a destination device. They are also used to provide an HDMI signal out from the Transmitters to a local destination device. The following table provides cable pinout details for HDMI connections.

| HDMI Connector Cable Pinout | |
|---|---|
| **Pin** | **Signal Assignment** |
| 1 | TMDS Data 2+ |
| 2 | TMDS Data 2 Shield |
| 3 | TMDS Data 2- |
| 4 | TMDS Data 1+ |
| 5 | TMDS Data 1 Shield |
| 6 | TMDS Data 1- |
| 7 | TMDS Data 0+ |
| 8 | TMDS Data 0 Shield |
| 9 | TMDS Data 0- |
| 10 | TMDS Clock+ |
| 11 | TMDS Clock Shield |
| 12 | TMDS Clock- |
| 13 | CEC |
| 14 | Utility |
| 15 | SCL |
| 16 | SDA |
| 17 | DDC/CEC Ground |
| 18 | +5 V Power (max. 55 mA) |
| 19 | Hot Plug Detect |

**Note:** *DVI-to-HDMI cables may be required for particular system needs (see page 118).*

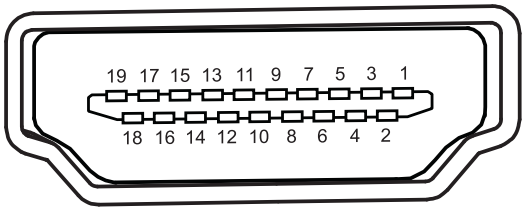



**FIG. 27** Pinout table and HDMI receptacle pins on DXLink Fiber unit

## HD-15 Connector Cable Pinout

HD-15 connectors are found on the DXLink Fiber Transmitters. These connectors are used to accept a variety of analog video signals from a source device. The following table provides cable pinout details for HD-15 connections for VGA, VGA-RGBS, VGA-RGsB, component, S-Video, and composite.

| HD-15 Connector Cable Pinout | | | | | | |
|---|---|---|---|---|---|---|
| **Input Pin #** | **VGA-RGBHV** | **VGA-RGBS** | **VGA-RGsB** | **Component** | **S-Video** | **Composite** |
| 1 | Red | Red | Red | Pr | n/c | n/c |
| 2 | Green | Green | Green+Sync | Y | Y | Composite |
| 3 | Blue | Blue | Blue | Pb | C | n/c |
| 4 | n/c | n/c | n/c | n/c | n/c | n/c |
| 5 | GND | GND | GND | n/c | n/c | n/c |
| 6 | GND - Red | GND - Red | GND - Red | GND - Pr | n/c | n/c |
| 7 | GND - Green | GND - Green | GND - Green | GND - Y | GND - Y | GND - Composite |
| 8 | GND - Blue | GND - Blue | GND - Blue | GND - Pb | GND - C | n/c |
| 9 | +5 V DDC | +5 V DDC | +5 V DDC | n/c | n/c | n/c |
| 10 | GND | GND | GND | n/c | n/c | n/c |
| 11 | n/c | n/c | n/c | n/c | n/c | n/c |
| 12 | DDC_SDA | DDC_SDA | DDC_SDA | n/c | n/c | n/c |
| 13 | H Sync | S | n/c | n/c | n/c | n/c |
| 14 | V Sync | n/c | n/c | n/c | n/c | n/c |
| 15 | DDC_SCL | DDC_SCL | DDC_SCL | n/c | n/c | n/c |

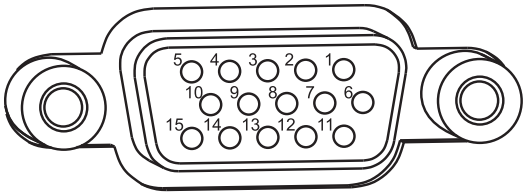



**FIG. 28** Pinout table and HD-15 receptacle pins on DXLink Fiber unit

## DVI Pinout for DVI-to-HDMI Cable

The pinout in FIG. 29 is for the DVI receptacle for a DVI-to-HDMI cable which can be used with the DXLink Fiber unit when a DVI-D source signal is required.

| DVI Cable Connector Pinout | |
|---|---|
| **DVI Input Pin #** | **Signal Name** |
| 1 | Data 2- |
| 2 | Data 2+ |
| 3 | Gnd |
| 4 | n/c |
| 5 | n/c |
| 6 | DDC-CLK |
| 7 | DDC-Data |
| 8 | n/c |
| 9 | Data 1- |
| 10 | Data 1+ |
| 11 | Gnd |
| 12 | n/c |
| 13 | n/c |
| 14 | +5 VDC in |
| 15 | Gnd |
| 16 | Hot-Detect |
| 17 | Data 0- |
| 18 | Data 0+ |
| 19 | Gnd |
| 20 | n/c |
| 21 | n/c |
| 22 | Gnd |
| 23 | CLK+ |
| 24 | CLK- |

*The +5 VDC on output pin 14 supplies a maximum of 55 mA.

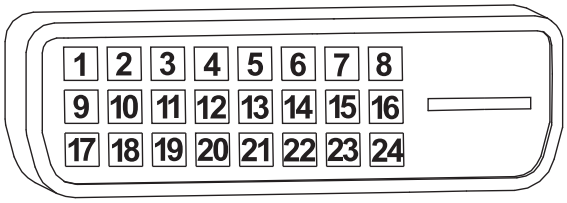



**FIG. 29** Pinout table and DVI pinout for DVI receptacle

# Appendix E – Supported Input Resolutions

## Available Pixel Display and Refresh Rate

The available pixel display and refresh rates for the input devices connected to the DXLink Fiber Transmitters are listed in this appendix.

The resolutions in the following tables are supported on the DXLink Fiber Transmitters and can be set using a SEND_COMMAND. The horizontal/vertical/refresh information from the Resolution Name (in the first column) can be entered in a SEND_COMMAND (`VIDIN_PREF_EDID`) to specify the preferred resolution for the various video inputs (DVI, HDMI, and VGA) for the Transmitters. For complete command information, see page 66.

### DVI, HDMI, and VGA Supported Input Resolutions

**DVI, HDMI, and VGA Supported Input Resolutions**

| Resolution Name | Horizontal Active Pixels | Vertical Active Pixels | Refresh (Hz) | HDMI and DVI Support | VGA Support | Comments | Video Standard |
|---|---|---|---|---|---|---|---|
| 640x400@85 | 640 | 400 | 85 | ✓ | ✓ | | VESA DMT |
| 640x480@60 | 640 | 480 | 60 | ✓ | ✓ | | VESA DMT |
| 640x480@72 | 640 | 480 | 72 | ✓ | ✓ | | VESA DMT |
| 640x480@75 | 640 | 480 | 75 | ✓ | ✓ | | VESA DMT |
| 640x480@85 | 640 | 480 | 85 | ✓ | ✓ | | VESA DMT |
| 720x400@85 | 720 | 400 | 85 | ✓ | ✓ | | VESA DMT |
| 720x480p@60 | 720 | 480 | 60 | ✓ | ✓ | 480p | CEA 861 |
| 720x480p@120 | 720 | 480 | 120 | ✓ | ✓ | 480p | CEA 861 |
| 720x480p@240 | 720 | 480 | 240 | ✓ | ✓ | 480p | CEA 861 |
| 720x576p@50 | 720 | 576 | 50 | ✓ | ✓ | 576p | CEA 861 |
| 720x576p@100 | 720 | 576 | 100 | ✓ | ✓ | 576p | CEA 861 |
| 720x576p@200 | 720 | 576 | 200 | ✓ | ✓ | 576p | CEA 861 |
| 800x600@56 | 800 | 600 | 56 | ✓ | ✓ | | VESA DMT |
| 800x600@60 | 800 | 600 | 60 | ✓ | ✓ | | VESA DMT |
| 800x600@72 | 800 | 600 | 72 | ✓ | ✓ | | VESA DMT |
| 800x600@75 | 800 | 600 | 75 | ✓ | ✓ | | VESA DMT |
| 800x600@85 | 800 | 600 | 85 | ✓ | ✓ | | VESA DMT |
| 848x480@60 | 848 | 480 | 60 | ✓ | ✓ | | VESA DMT |
| 848x480@75 | 848 | 480 | 75 | ✓ | ✓ | | VESA CVT |
| 848x480@85 | 848 | 480 | 85 | ✓ | ✓ | | VESA CVT |
| 1024x640@60 | 1024 | 640 | 60 | ✓ | ✓ | | VESA CVT |
| 1024x768@60 | 1024 | 768 | 60 | ✓ | ✓ | | VESA DMT |
| 1024x768@70 | 1024 | 768 | 70 | ✓ | ✓ | | VESA DMT |
| 1024x768@75 | 1024 | 768 | 75 | ✓ | ✓ | | VESA DMT |
| 1024x768@85 | 1024 | 768 | 85 | ✓ | ✓ | | VESA DMT |
| 1152x864@75 | 1152 | 864 | 75 | ✓ | ✓ | | VESA DMT |

| DVI, HDMI, and VGA Supported Input Resolutions (continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Resolution Name** | **Horizontal Active Pixels** | **Vertical Active Pixels** | **Refresh (Hz)** | **HDMI and DVI Support** | **VGA Support** | **Comments** | **Video Standard** |
| 1280x720@60 | 1280 | 720 | 60 | ✓ | ✓ | | VESA DMT |
| 1280x720p@60 | 1280 | 720 | 60 | ✓ | ✓ | 720p | CEA 861 |
| 1280x720p@100 | 1280 | 720 | 100 | ✓ | ✓ | 720p | CEA 861 |
| 1280x720p@120 | 1280 | 720 | 120 | ✓ | ✓ | 720p | CEA 861 |
| 1280x768@60 | 1280 | 768 | 60 | ✓ | ✓ | | VESA DMT |
| 1280x768@75 | 1280 | 768 | 75 | ✓ | ✓ | | VESA DMT |
| 1280x768@85 | 1280 | 768 | 85 | ✓ | ✓ | | VESA DMT |
| 1280x800@60 | 1280 | 800 | 60 | ✓ | ✓ | | VESA CVT |
| 1280x960@60 | 1280 | 960 | 60 | ✓ | ✓ | | VESA DMT |
| 1280x960@85 | 1280 | 960 | 85 | ✓ | ✓ | | VESA DMT |
| 1280x1024@60 | 1280 | 1024 | 60 | ✓ | ✓ | | VESA DMT |
| 1280x1024@75 | 1280 | 1024 | 75 | ✓ | ✓ | | VESA DMT |
| 1280x1024@85 | 1280 | 1024 | 85 | ✓ | ✓ | | VESA DMT |
| 1360x768@60 | 1360 | 768 | 60 | ✓ | ✓ | | VESA DMT |
| 1400x1050@60 | 1400 | 1050 | 60 | ✓ | ✓ | | VESA DMT |
| 1400x1050@75 | 1400 | 1050 | 75 | ✓ | ✓ | | VESA DMT |
| 1440x900@60 | 1440 | 900 | 60 | ✓ | ✓ | | VESA DMT |
| 1440x900@75 | 1440 | 900 | 75 | ✓ | ✓ | | VESA DMT |
| 1440x900@85 | 1440 | 900 | 85 | ✓ | ✓ | | VESA DMT |
| 1600x1200@60 | 1600 | 1200 | 60 | ✓ | ✓ | | VESA DMT |
| 1680x1050@60 | 1680 | 1050 | 60 | ✓ | ✓ | | VESA CVT |
| 1920x1080i@50 | 1920 | 540 | 50 | ✓ | | HDMI & DVI only - 1080i | CEA 861 |
| 1920x1080i@60 | 1920 | 540 | 60 | ✓ | | HDMI & DVI only - 1080i | CEA 861 |
| 1920x1080p@25 | 1920 | 1080 | 25 | ✓ | ✓ | 1080p | CEA 861 |
| 1920x1080p@30 | 1920 | 1080 | 30 | ✓ | ✓ | 1080p | CEA 861 |
| 1920x1080p@50 | 1920 | 1080 | 50 | ✓ | ✓ | 1080p | CEA 861 |
| 1920x1080@60 | 1920 | 1080 | 60 | | ✓ | Reduced Blanking | VESA CVT |
| 1920x1080p@60 | 1920 | 1080 | 60 | ✓ | ✓ | 1080p | CEA 861 |
| 1920x1200@60 | 1920 | 1200 | 60 | ✓ | ✓ | Reduced Blanking | VESA CVT |

## Composite and S-Video Supported Input Resolutions

| Composite and S-Video Supported Input Resolutions | | | | | |
|---|---|---|---|---|---|
| **Resolution Name** | **Horizontal Active Pixels** | **Vertical Active Pixels** | **Refresh (Hz)** | **Comments** | **Video Standard** |
| 720x480i@60 | 720 | 240 | 60 | 480i | CEA |
| 720x576i@50 | 720 | 288 | 50 | 576i | CEA |

## Component Video Supported Input Resolutions

| Component Video Supported Input Resolutions | | | | | |
|---|---|---|---|---|---|
| **Resolution Name** | **Horizontal Active Pixels** | **Vertical Active Pixels** | **Refresh (Hz)** | **Comments** | **Video Standard** |
| 720x480i@60 | 720 | 240 | 59.9 | 480i | CEA 770.2 |
| 720x480p@60 | 720 | 480 | 59.9 | 480p | SMPTE 293M<br>CEA 770.2<br>ITU-R BT. 1358 |
| 720x576i@50 | 720 | 288 | 50 | 576i | |
| 720x576p@50 | 720 | 576 | 50 | 576p | ITU-R BT. 1358 |
| 1280x720p@60 | 1280 | 720 | 59.9 | 720p | SMPTE 296M<br>CEA 770.3 |
| 1920x1080i@50 | 1920 | 540 | 50 | 1080i50 | SMPTE 274M |
| 1920x1080i@60 | 1920 | 540 | 59.9 | 1080i | SMPTE 274M<br>CEA 770.3 |
| 1920x1080p@50 | 1920 | 1080 | 50 | 1080p50 | SMPTE 274M |
| 1920x1080p@60 | 1920 | 1080 | 59.9 | 1080p | SMPTE 274M |

# Appendix F – Supported Output Resolutions

## HDMI and DVI Supported Output Resolutions

The resolutions in the following table are supported on the DXLink Fiber RX and can be set using a SEND_COMMAND. The horizontal/vertical/refresh information from the Resolution Name (in the first column) can be entered in a SEND_COMMAND command (`VIDOUT_RES_REF`) to specify scaling parameters for the DXLink Fiber RX. For complete command information, see page 66.

**Note:** *The resolutions and timings in the table below can only be changed with SEND_COMMANDs.*

**HDMI and DVI Supported Output Resolutions**

| Resolution Name | Horizontal Active Pixels | Vertical Active Pixels | Refresh (Hz) | Comments | Video Standard |
|---|---|---|---|---|---|
| 640x480@60 | 640 | 480 | 60 | | VESA DMT |
| 640x480@72 | 640 | 480 | 72 | | VESA DMT |
| 640x480@75 | 640 | 480 | 75 | | VESA DMT |
| 800x600@60 | 800 | 600 | 60 | | VESA DMT |
| 800x600@72 | 800 | 600 | 72 | | VESA DMT |
| 800x600@75 | 800 | 600 | 75 | | VESA DMT |
| 1024x768@60 | 1024 | 768 | 60 | | VESA DMT |
| 1024x768@70 | 1024 | 768 | 70 | | VESA DMT |
| 1024x768@75 | 1024 | 768 | 75 | | VESA DMT |
| 1280x720p@50 | 1280 | 720 | 50 | 720p | CEA 861 |
| 1280x720p@60 | 1280 | 720 | 60 | 720p | CEA 861 |
| 1280x768@60 | 1280 | 768 | 60 | | |
| 1280x800@60 | 1280 | 800 | 60 | | VESA CVT |
| 1280x1024@60 | 1280 | 1024 | 60 | | VESA DMT |
| 1360x768@60 | 1360 | 768 | 60 | | VESA DMT |
| 1440x900@60 | 1440 | 900 | 60 | | VESA CVT |
| 1600x1200@60 | 1600 | 1200 | 60 | | VESA DMT |
| 1680x1050@60 | 1680 | 1050 | 60 | | VESA CVT |
| 1920x1080@60 | 1920 | 1080 | 60 | 1080 | VESA CVT |
| 1920x1080p@50 | 1920 | 1080 | 50 | 1080p | CEA 861 |
| 1920x1080p@60 | 1920 | 1080 | 60 | 1080p | CEA 861 |
| 1920x1200@60 | 1920 | 1200 | 60 | Reduced Blanking | VESA CVT-R |

# Digital Video Output Resolution Support

**Important:** *The resolutions and timings in the lists in this section can only be set using DGX Configuration Software via the Enova DGX Switcher when the DXLink Receiver is being used directly from a DXLink Fiber Output Board.*

## CEA (RGB Color Space):

640x480p@59Hz
720x480p@59Hz
720(1440)x480i@59Hz
720x480p@60Hz
720x480p@119Hz
720x480p@120Hz
720x480p@239Hz
720x480p@240Hz
720x576p@50Hz
720(1440)x576i@50Hz
720x576p@100Hz
720x576p@200Hz
768x576p@50Hz
960x576p@50Hz
960(1920)x576i@50Hz
1280x720p@23Hz
1280x720p@24Hz
1280x720p@25Hz
1280x720p@29Hz
1280x720p@30Hz
1280x720p@50Hz
1280x720p@59Hz
1280x720p@60Hz
1280x720p@100Hz
1280x720p@119Hz
1280x720p@120Hz
1920x1080p@23Hz
1920x1080p@24Hz
1920x1080i@25Hz
1920x1080p@25Hz
1920x1080i@29Hz
1920x1080p@29Hz
1920x1080i@30Hz
1920x1080p@30Hz
1920x1080p@50Hz
1920x1080p@59Hz
1920x1080p@60Hz

### CVR (RGB Color Space):

768x480p@60Hz
800x600p@60Hz
800x600p@120Hz
848x480p@60Hz
960x600p@60Hz
1024x576p@60Hz
1024x640p@60Hz
1024x768p@60Hz
1024x768p@120Hz
1064x600p@60Hz
1152x720p@60Hz
1152x864p@60Hz
1224x768p@60Hz
1280x720p@60Hz
1280x768p@60Hz
1280x768p@120Hz
1280x800p@120Hz
1280x960p@60Hz
1280x1024p@60Hz
1360x768p@60Hz
1360x768p@120Hz
1400x1050p@60Hz
1440x900p@60Hz
1536x960p@60Hz
1600x1000p@60Hz
1600x1200p@60Hz
1680x1050p@60Hz
1704x960p@60Hz
1728x1080p@60Hz
1800x1350p@60Hz
1864x1050p@60Hz
1920x1080p@60Hz
1920x1200p@60Hz

### CVT (RGB Color Space):

640x360p@85Hz
640x400p@75Hz
640x400p@85Hz
640x480p@75Hz
640x480p@85Hz
768x480p@60Hz
768x480p@75Hz
768x480p@85Hz
800x600p@50Hz
800x600p@60Hz
800x600p@75Hz
800x600p@85Hz
848x480p@50Hz
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1600x1000p@50Hz
1600x1000p@60Hz
1600x1200p@50Hz
1600x1200p@60Hz
1680x1050p@50Hz
1680x1050p@60Hz
1704x960p@50Hz
1704x960p@60Hz
1728x1080p@50Hz
728x1080p@60Hz
1864x1050p@50Hz
1864x1050p@60Hz
1920x1080p@50Hz
1920x1200p@50Hz

### DMR (RGB Color Space):

1280x800p@60Hz
1366x768p@60Hz
1600x900p@60Hz

### DMT (RGB Color Space):

640x350p@85Hz
640x400p@85Hz
640x480p@60Hz
640x480p@72Hz
640x480p@75Hz
640x480p@85Hz
720x400p@85Hz
800x600p@56Hz
800x600p@60Hz
800x600p@72Hz
800x600p@75Hz
800x600p@85Hz
848x480p@60Hz
1024x768i@43Hz
1024x768p@60Hz
1024x768p@70Hz
1024x768p@75Hz
1024x768p@85Hz
1152x864p@70Hz
1152x864p@75Hz
1152x864p@85Hz
1280x800p@60Hz
1280x960p@60Hz,
280x960p@75Hz
1280x960p@85Hz
1280x1024i@43Hz
1280x1024p@60Hz
1280x1024p@75Hz
1280x1024p@85Hz
1360x768p@60Hz
1366x768p@60Hz
1600x1200i@48Hz
1600x1200p@60Hz

# Appendix G – Fiber Transceiver Replacement

## Applicability Notice

This appendix pertains to replacement of SFP+ fiber optic transceivers for the DXLink Fiber Transmitters and Receivers listed in the table on page 12.

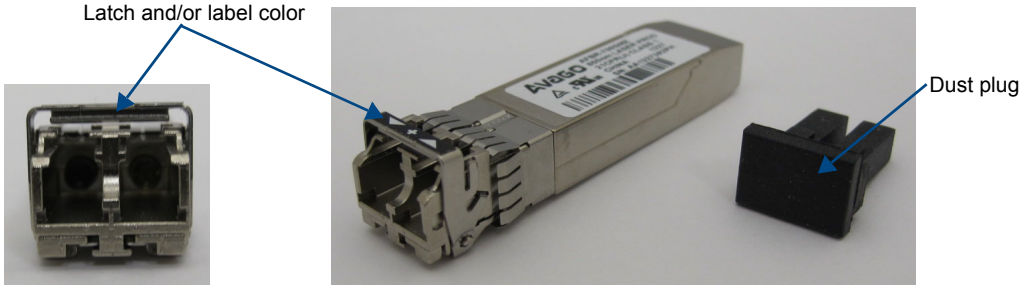



**FIG. 30** SFP+ Fiber Optic Transceiver, Duplex (blue handle = single mode; black handle = multimode)

The process for removing and replacing transceivers is the same in Enova DGX DXLink Fiber Boards as it is in the DXLink Fiber units and the same for multimode transceivers (black latch) as it is for single mode transceivers (bright blue latch).

### *Items Required*

- ❑ Replacement SFP+ fiber optic transceiver
- ❑ DXLink Fiber unit or DXLink Fiber board
- ❑ ESD wristband and cord with alligator clip
- ❑ ESD shielded bag for storage of removed transceiver

**Compatibility Note:** *In Enova DGX systems using DXLink Fiber technology – the DXLink Fiber Input Board and its DXLink Fiber TX, Duplex must have the same type of fiber optic transceivers: either multimode or single mode. The same holds true for DXLink Fiber Output Boards and the DXLink Fiber RX, Duplex units.*

## Important Information for Fiber Transceiver Replacement

**Warning:** *DXLink Fiber units use laser transceivers, which are Class 1 Eye Safe per IEC 60825-1/CDRH requirements. While the Class 1 category indicates that the invisible laser used is safe, we recommend avoiding direct eye exposure when using any optical fiber products (see the OSHA directive on page 13).*

- Replacement transceivers *must* match those replaced: either single mode or multimode.
- Adding or replacing SFP+ transceivers should be done only by personnel trained to handle ESD sensitive parts and assemblies.
- If disposal of transceivers is necessary, dispose of them as mandated by your area or country guidelines.

**Note:** *When fiber optic transceivers are not cabled (e.g., for shipping or storage), replace the dust plugs that originally shipped with the product.*

**ESD Warning:** *To avoid ESD (Electrostatic Discharge) damage to sensitive components, make sure you are properly grounded before touching any internal DXLink Fiber TX/RX materials. Use an ESD wristband and cord with an alligator clip attached to a good ground source.*

# Replacing an SFP+ Fiber Optic Transceiver

*Tips for Fiber Optic Connections:*

- ❑ Keep dust plugs in transceivers until you are ready to make a connection.
- ❑ Clean fiber optic cable ends before attaching to transceivers (be sure to follow the cable manufacturer's instructions for inspecting and cleaning the cable ends).
- ❑ Use gentle pressure when connecting fiber cables to transceivers (normally an audible click is heard when the connector engages).
- ❑ If unsure the connection is properly seated, gently tug on the transceiver.
- ❑ If fiber cables are removed from the transceivers, reinsert dust plugs.
- ❑ Multimode transceivers only – If you are unsure that a multimode transceiver is passing a signal, hold the unattached end of the fiber optic cable away from you and take a picture of it with a digital camera (or cell phone camera). The image will show a bright light if the signal is being passed (works on most digital cameras and cell phone cameras).

In the following procedure, read each step entirely. The steps include helpful tips to avoid damage to DXLink Fiber products.

## To remove and replace an SFP+ fiber optic transceiver:

1. Disconnect fiber cables or dust plugs that are attached to the SFP+ fiber optic transceiver.
2. Using the tip of the index finger, swing the transceiver latch out and down.

**FIG. 31** Flip transceiver latch out and down (DXLink Fiber Transmitter shown)

3. Use the handle to release and carefully pull the transceiver completely free from its socket.

**FIG. 32** Pull transceiver free from transceiver socket

4. Restore the removed transceiver's latch to an upright position and replace the dust plug that originally shipped with the transceiver. Place the transceiver in an ESD shielded bag and set aside.

**Tip:** *Leave the dust plug in the replacement transceiver for Step 5 to reduce possibility of damaging the transceiver / socket.*

5. With the replacement transceiver's latch in the up (locked) position, gently insert the transceiver straight into the transceiver socket until resistance is felt (an audible click will be heard when it is fully seated).

**FIG. 33** Insert transceiver into transceiver socket

6. Verify proper seating by gently pulling on the transceiver with the latch in the locked position.

**FIG. 34** Transceiver latch in upright position

7. Remove the dust plug and save for future use.
8. Attach the fiber cable (see "Tips for Fiber Optic Connections" on page 128).
9. Test the signal path.

# Appendix H – EDID Management/Programming

## DXLink Fiber and EDID

### EDID Overview

EDID (Extended Display Identification Data) is a data structure established by the Video Electronics Standards Association (VESA) to enable plug-and-play support by enabling easy configuration of a source's graphics subsystem based on the capabilities of the attached display device.

EDID information includes items such as the following:

- Manufacturer's name
- Product type
- Supported video resolutions and refresh rates
- Color space and filter chromaticity
- Detailed timings

When a source is directly connected to a display device, it can use the display device's EDID information to determine an initial compatible video signal to send. With the source's display controls, the user can modify this selection to another compatible signal based on the provided EDID information.

### AMX DXLink supported EDIDs

Many EDIDs can be stored on the DXLink Transmitter and the DXLink Fiber Input board for each input – HD-15 (analog) and HDMI (digital).

The AMX DXLink supported EDIDs are classified as follows:

- ALL RESOLUTIONS (default for both analog and digital inputs)
- WIDE-SCREEN
- FULL-SCREEN
- USER EDID 1
- USER_EDID_MODIFIED

Any one of these EDIDs can be loaded and activated for their respective input connection by using the ICSP command VIDIN_EDID (see page 73). These EDIDs and the active EDID persist over a power cycle of the Transmitter, the switcher, or both, as well as when the attached Transmitter is replaced with a new Transmitter. Analog and digital EDIDs function similarly but are managed for each input independently.

**Important:** *For all analog (VGA) EDIDs, to detect a new EDID the source must be power cycled.*

### ALL RESOLUTIONS, WIDE-SCREEN, and FULL-SCREEN

These three EDIDs come preprogrammed, loaded for both analog and digital inputs. These EDIDs are fixed and *cannot* be modified. The ALL RESOLUTIONS EDID will cover most video configurations resulting in high quality video at the displays. The other EDIDs are provided for those special cases that require refinement of the supported resolutions or preferred timings to achieve the best image for each display.

| EDID Name | Digital Description | Analog Description |
|---|---|---|
| ALL RESOLUTIONS | 1080p preferred; Basic Audio (Default, ALL RESOLUTIONS) | 1080p preferred (Default VGA EDID, ALL RESOLUTIONS) |
| FULL-SCREEN | 1600x1200 preferred (FULL-SCREEN resolutions); Basic Audio | 1600x1200 preferred (FULL-SCREEN resolutions) |
| WIDE-SCREEN | 1080p preferred (WIDE-SCREEN resolutions); Basic Audio | 1080p preferred (WIDE-SCREEN resolutions) |

### USER EDID 1

This EDID is empty until an EDID is programmed/uploaded by using DGX Configuration software (see page 132). It can be programmed either through the switcher and Input board that the Transmitter is connected to or through the USB Program port on the Transmitter. If the command is sent to load USER EDID 1 prior to any EDID being programmed, then the previously loaded EDID will remain on the input.

| EDID Name | Digital Description | Analog Description |
|---|---|---|
| USER EDID 1 | User supplied custom EDID | User supplied custom EDID |

### USER_EDID_MODIFIED

This EDID is empty until a preferred timing is set through the SEND_COMMAND: VIDIN_PREF_EDID. For a table listing supported input resolutions that can be made the preferred EDID timing, see page 119. This EDID modifies the current active EDID by replacing the preferred timing with the format desired.

| EDID Name | Digital Description | Analog Description |
|---|---|---|
| USER_EDID_MODIFIED | EDID containing preferred timing set by SEND_COMMAND 'VIDIN_PREF_EDID-<format>' | EDID containing preferred timing set by SEND_COMMAND 'VIDIN_PREF_EDID-<format>' |

### MIRROR OUT 1

This EDID mirrors the downstream EDID of the connected DXLink device. When connected to a DXLink Input Board, this EDID will be the same as USER EDID 1.

| EDID Name | Digital Description | Analog Description |
|---|---|---|
| MIRROR OUT 1 | Interpreted as USER EDID 1 when TX is connected to a DXLink Fiber Input Board | Interpreted as USER EDID 1 when TX is connected to a DXLink Fiber Input Board |

### MIRROR_OUT_LOCAL

This EDID is the digital EDID from the last sink attached to the local out port. This can only be applied to the HDMI input. This EDID does not persist over a power cycle. If you wish this EDID to persist, you can load it onto the HDMI input using the SEND_COMMAND: VIDIN_EDID-MIRROR_OUT_LOCAL, read it using DGX configuration software from the HDMI input and then writes it back to the HDMI input. The EDID will then be saved as USER EDID 1.

| EDID Name | Digital Description | Analog Description |
|---|---|---|
| MIRROR_OUT_LOCAL | EDID read from sink connected to LOCAL OUT | NA |

### AMX EDID Library

An AMX EDID Library is available at www.amx.com (search for EDID Library). This library provides EDID files that can be used with AMX products. A report is provided for each EDID file, which describes the EDID features in detail, in order to assist you in selecting the most appropriate EDID for your system needs.

- Check the Library to determine if one of the custom EDID files meets your needs. (The custom EDID files are variants of base/standard EDIDs.)
- DGX Configuration Software can be used to reprogram the EDID on the input port with one of the .edid files provided in the EDID library (see page 132).

# DGX Configuration Software Overview

**Important:** *Because signals routed through DXLink Fiber Transmitters normally produce a quality image, you will not need the information in this appendix unless the installation has special EDID requirements for HDMI or VGA.*

AMX's DGX Configuration Software has a tabbed view for EDID Programming. This view can be used to re-program the EDID EEPROM chips for the HD-15 and HDMI connectors on the DXLink Fiber Transmitters, allowing for custom configuration of the EDID data that is stored on them.

**Note:** *Scaling and HDCP settings can be applied via SEND_COMMANDs (see the chapter "NetLinx Programming of DXLink Fiber Transmitters and Receivers" on page 66). If a DXLink Fiber Receiver is connected to an Enova DGX DXLink Fiber Output Board, DGX Configuration Software can be used via the Enova DGX for scaling (see the "Instruction Manual – Enova DGX 8/16/32/64").*

DGX Configuration Software is available at www.amx.com (see DXLink Fiber Transmitter product pages) and includes a standard Help file with detailed information.

### *PC System Requirements for DGX Configuration Software v1.0.5*

- ❑ Windows 7 and Windows XP Professional
- ❑ Minimum Hardware: 166 MHz, 128 MB RAM, 36 MB of free disk space*, 800x600 display, serial port, video card with dual outputs (see Caution below)
- ❑ Recommended Hardware: 2.0 GHz, 512 MB RAM*

* The installation process requires 36 MB of disk space for the DGX Configuration Software installer. Once installed, the program requires 10 MB of disk space.

**Caution:** *We strongly urge the user not to use video cards with DMS-59 connectors. Video cards with DMS-59 connectors have been shown to fail consistently and, in the worst case, can corrupt an EDID data file. A laptop PC with a VGA or DVI out is a good solution. Cards with 2 DVI connectors, 2 VGA connectors, or 1 DVI and 1 VGA connector are also acceptable.*

# Software Installation on PC

**Important:** *Administrator rights are required to install DGX Configuration Software.*

### To install DGX Configuration Software:

1. From the DXLink Fiber Transmitter's product page at www.amx.com (under Application Files on the right) double-click, "DGX Configuration Software."
2. Click "I Accept" for the AMX License Agreement, and then select Open to download the file.
3. Optional – Select DGX_Config_SoftwareReadMe_vX_X to read about the software before installation.
4. Click the application file (which is zipped).
5. In the Compressed (zipped) Folders dialog box, click Extract All.
6. Select a destination for the files.
7. When the download is complete, click the application file and follow the directions in the installation wizard.

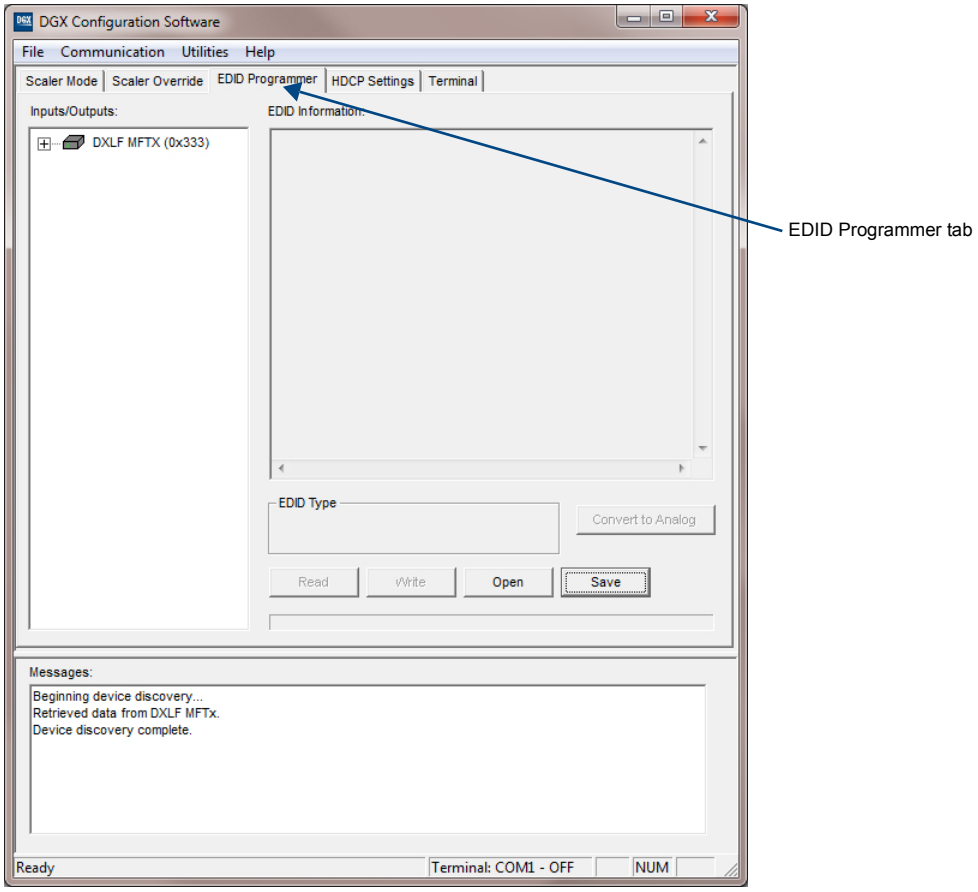
# DXLink Fiber Connection to PC

## To use DGX Configuration Software with a DXLink Fiber Transmitter:

1. Attach one end of a USB mini-B cable to the Program port on the front of the DXLink Fiber Transmitter.
2. Attach the open end of the USB mini-B cable to the PC where the DGX Configuration Software was installed.
3. Apply power to the Transmitter.
4. On the PC, open the DGX Configuration Software.

**Note:** *The PC will automatically establish a virtual COM port on the Transmitter.*

5. If changing the communication settings is necessary*:
   a. From the Communication menu (in the DGX Configuration Software), select Serial Port.
   b. Select Change Settings to change the serial port and/or the baud rate for the PC's serial port. The baud rate for the PC *must* match the baud rate for the Transmitter. The recommended (default) baud rate setting for serial communication over USB with DXLink Fiber Transmitters is 115200.
   c. If you changed any of the settings, from the Communication menu select Refresh Device Lists.
6. **Select the EDID Programmer tab in the interface** (defaults to the Scaler Mode tab**).




* If you are unsure of the USB Serial Port (COM <number>) being used, on the PC go to Start > Control Panel > Device Manager and expand the "Ports" to verify the COM number.

** Scaling and HDCP settings can be applied via SEND_COMMANDs (see page 66).

### General Notes for Working with DGX Configuration Software and DXLink Fiber TXs

When a DXLink Fiber TX is connected to a PC running DGX Configuration Software, the following applies:

- DGX Configuration Software displays the connected Transmitter only.
- File menu – Select Open File to load an .edid file to the program. Select Save to File to save an .edid file containing the currently displayed settings in the EDID Programmer view.
- Communication menu – Use to change the serial communication settings. This menu also includes the option to "Refresh Device Lists," which will refresh the device list in the EDID Programmer tab.
- Utilities menu – This menu does not apply to DXLink Fiber Transmitters.
- Help menu – Select to access the Help file for the program or open a link for the Web Update option (to download updates for the program) or view current version information.
- Messages in the bottom pane of the DGX Configuration Software dialog box report status of operations. Messages can be copied* for technical support purposes.

* Right-click on a message to access a shortcut menu with options to Copy Selected, Copy All, or Clear. When copying multiple messages: either select consecutive items by holding down the Shift key and clicking the first and last item **or** select nonconsecutive items by holding down the Control key and clicking on each item.

## EDID Programmer View

From the EDID Programmer view, EDID EEPROM chips for the HD-15 (VGA) or HDMI connector on the Transmitter can be re-programmed if necessary.

### EDID Overview

EDID (Extended Display Identification Data) is a data structure established by the Video Electronics Standards Association (VESA) to enable plug-and-play support by enabling easy configuration of a source's graphics subsystem based on the capabilities of the attached display device.

EDID information includes items such as the following:

- Manufacturer's name
- Product type
- Supported video resolutions and refresh rates
- Color space and filter chromaticity
- Detailed timings

When a source is directly connected to a display device, it can use the display device's EDID information to determine an initial compatible video signal to send. With the source's display controls, the user can modify this selection to another compatible signal based on the provided EDID information.

### DXLink Fiber Equipment and EDID

In cases where the HD-15 (VGA) or HDMI input on a DXLink Fiber Transmitter is used and a resolution incompatibility exists (or if the source device needs a specific resolution or a limited set of resolutions), the DXLink Fiber Transmitters have the ability to update the VGA or HDMI EDID emulation file (by updating the EEPROM chip) which comes preloaded with an AMX VGA or HDMI EDID set.

The AMX VGA EDID set and the AMX HDMI EDID set each consist of a number of common EDID settings (for VGA and HDMI timing details, see page 119). In most cases, the DXLink Fiber Transmitter can be used as is from the factory with no adjustments.

The DGX Configuration Software with EDID programming functionality has been provided for cases where a user defined EDID set is desired (this *must* be a subset of the supported input resolutions shown in Appendix E; see page 119). The EDID Programmer view can be used for writing user defined VGA or HDMI EDID data to the DXLink Fiber Transmitter's HD-15 or HDMI input.

## Reading and Saving EDID Data from a DXLink Fiber Transmitter's Input Connector

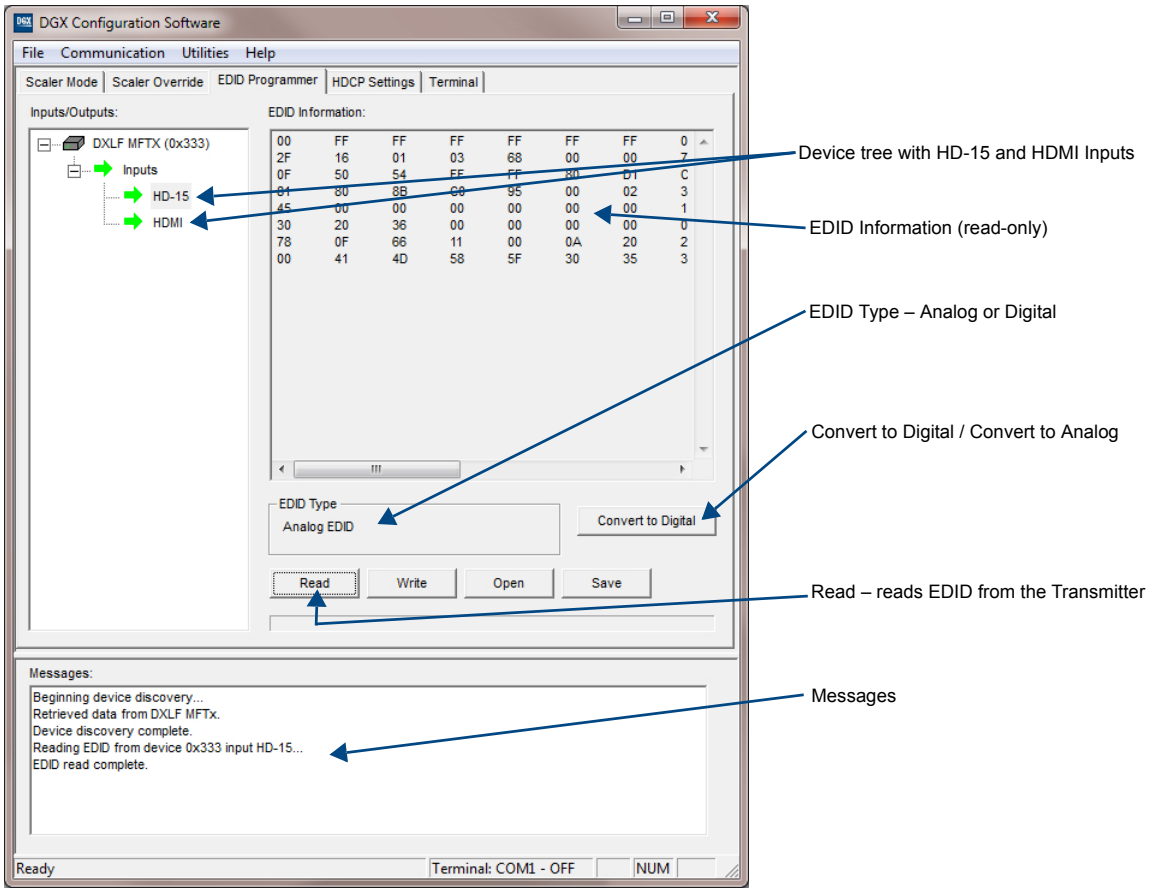
When DGX Configuration Software discovers and displays "Inputs" for an DXLink Fiber Transmitter, the input is numbered twice to allow for reading from either a VGA (HD-15) or an HDMI source device.
The DGX Configuration Software reads the EDID data from the USER EDID 1 EEPROM location, regardless of the VIDIN_EDID setting.

**Important:** *Unless a custom EDID has been previously written to the input, attempting to read the EDID will result in a Read Error message.*

The EDID data can be read to confirm the correct EDID has been programmed.

### To read and save EDID data from a DXLink Fiber Transmitter input:

1. On the PC, open the DGX Configuration Software and select the EDID Programmer tab.
2. Under Inputs/Outputs on the left, expand the device tree, and select either the HD-15 or HDMI Input.




3. Click Read to read the EDID information currently on the selected Input (HD-15 or HDMI).
   The EDID data appears in the EDID read-only field on the right.

**Tip:** *In the EDID Programmer view, the Save to File option under the File menu can be used to save the EDID information as an .edid file. The saved file can be opened as a text file (from the File menu, select Open File) and edited or opened and written to an input (click the Write button).*

### *Read Error Message*

A Read Error message will appear if the Transmitter has never been programmed with a valid/custom EDID or if the unit has been programmed with a corrupted EDID. A Read Error message will also appear when attempting to read the EDID after sending a FACTORYAV SEND_COMMAND, which re-initializes the USER EDID 1 EEPROM and resets the VIDIN_EDID setting to ALL RESOLUTIONS (which is **AMX_HDMI1v3__Standard** for HDMI and **AMX_VGA1v2__Standard** for VGA).

**Note:** *When a Transmitter is connected to a DXLink Fiber Input Board, the input board will override the "ALL RESOLUTIONS" EDID and load the last stored EDID.*

## Writing EDID Data to a DXLink Fiber Transmitter's Input Connector

When DGX Configuration Software discovers and displays "Inputs" for an DXLink Fiber Transmitter, the input is numbered twice to allow for reading from either an HDMI source device or a VGA (HD-15) source device.

Use the instructions that follow in conjunction with the EDID Programmer view to write user defined EDID information to the HDMI or HD-15 input connector on a DXLink Fiber Transmitter. User defined EDIDs are currently available from technical support. An "AMX Library" of EDID files will be available on at www.amx.com in conjunction with a future firmware release.

### To write EDID data to a DXLink Fiber Transmitter input:

1. Download the EDID set (either HDMI or VGA) from the EDID Library* (or an EDID set provided by technical support).
2. On the PC, open the DGX Configuration Software and select the EDID Programmer tab.
3. Under Inputs/Outputs on the left, expand the device tree, and select the HDMI or HD-15 Input.
4. From the File menu, select Open File to select the .edid file that was downloaded in Step 1.
5. Click Write to write the EDID information to the selected Input (either HDMI or HD-15).
6. Analog (VGA) only – The source must be power cycled to detect the new EDID.

* For information on the EDID Library, see page 131.

**Tip:** *You can confirm that the new EDID data was written to the HD-15 or HDMI input by selecting the input and clicking on the Read button* ***or*** *by using the SEND_COMMAND* `?VIDIN_EDID`*, which will return:* `VIDIN_EDID-USER EDID 1.`

**Important:** *You can revert to the factory default EDID for the HDMI or HD-15 input by using the SEND_COMMAND* `VIDIN_EDID-ALL RESOLUTIONS` *(i.e., the EDID file* ***AMX_HDMI1v3__Standard*** *for HDMI and* ***AMX_VGA1v2__Standard*** *for VGA).*

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